SONY

VIDEO GRAPHIC PRINTER

UP-960
UP-960CE

SERVICE MANUAL

1st Edition

⚠ WARNING

This manual is intended for qualified service personnel only.

To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

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SECTION 1
OPERATING INSTRUCTIONS

This section is extracted from operation manual.

3-862-477-**01** (1)

SONY

Video Graphic Printer

Instructions for Use Page 30

EN

CE

UP-960
UP-960CE

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Owner's Record

The model and serial numbers are located at the rear. Record these number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. _____
Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

Symbol on the products



This symbol indicates the equipotential terminal which brings the various parts of a system to the same potential.

For the customers in the U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

This device requires shielded interface cables to comply with FCC emission limits.

For the customers in Canada (for UP-960 only)

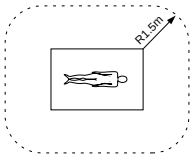
This unit has been certified according to Standard CSA C22.2 No.601.1.

For the customers in Europe

Important safeguards/notices for use in the medical environments

1. All the equipments connected to this unit shall be certified according to Standard IEC601-1, IEC950, IEC65 or other IEC/ISO Standards applicable to the equipments.
2. When this unit is used together with other equipment in the patient area*, the equipment shall be either powered by an isolation transformer or connected via an additional protective earth terminal to system ground unless it is certified according to Standard IEC601-1.

   * Patient Area



3. The leakage current could increase when connected to other equipment.

4 This equipment generates, uses, and can radiate frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to other equipment. If this unit causes interference (which can be determined by unplugging the power cord from the unit), try these measures: Relocate the unit with respect to the susceptible equipment. Plug this unit and the susceptible equipment into different branch circuit. Consult your dealer.

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Overview

The UP-960/960CE is a monochrome video graphic printer that reproduces images from video equipment. Large size picture can be printed out quickly and easily using the following features:

Clear and stable print quality
- High definition, 6.4 dots/mm printing
- 256 gradations of black and white.
- Stable printouts by the temperature compensation technology
- High density printouts using the UPP-210HD printing paper.

Two ways printing direction and two printing size selectable
- The printing direction selector on the front panel enables you to print in vertical and horizontal directions.
- The printing size control on the front panel enables you to select two kinds of printing size.

DIP switches to optimize the printer
- You can make printouts with bottom end first or upper part of the screen first by using the DIRECTION DIP switch.
- Aspect ratio of printouts can be set to 4:3 or 1:1 by using the ASPECT DIP switch.
- You can change the range to be printed out by using the SCAN DIP switch.

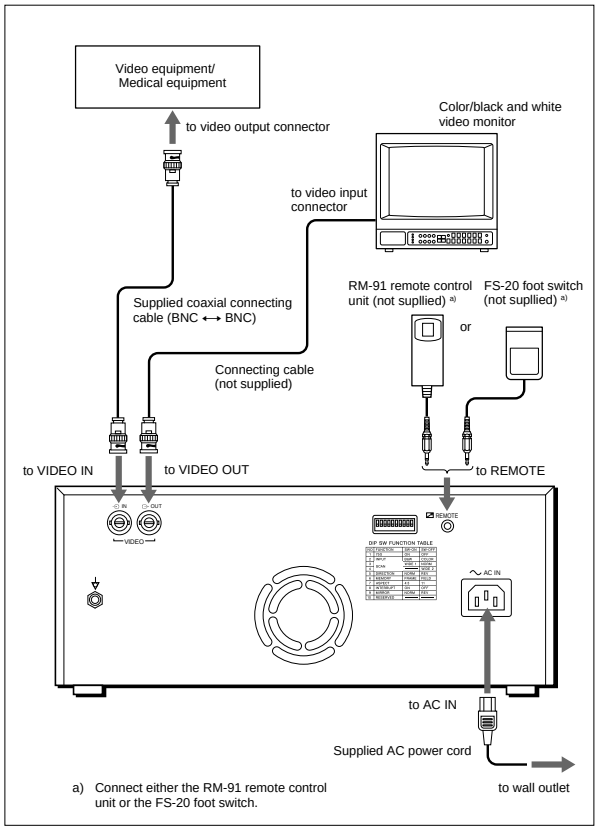
Fast printing
- You can make a single printout in about 10 seconds
- You can make a maximum of 11 copies of the same image continuously.

Automatic video signal discrimination
The type of input video signal (EIA or CCIR) is automatically discriminated and printed adequately; there is no need to change any switch manually.

Easy and quick paper loading
You can load paper just by opening the door panel with the OPEN/CLOSE button and placing the paper roll.

Connection

Notes
- Turn off the power to each device before making any connections.
- Connect the AC power cord last.
- Before making connections, see “Important safeguards/notices for use in the medical environment” on page 30.



a) Connect either the RM-91 remote control unit or the FS-20 foot switch.

Setting the DIP Switches

You can set the printer to the required print mode using the DIP switches.
The printer has two kinds of DIP switches;

- DIP switch on the sub panel
  You can set the print mode frequently used in daily operation easily on the sub panel.
- DIP switches on the rear panel
  You can set the print mode and printer specifications you do not need to change settings frequently.

How to change the DIP switch setting

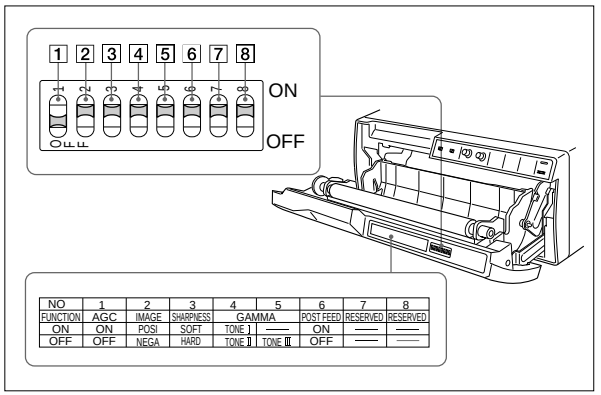
Before setting the DIP switches, turn the power off. Change the settings using a small pointed tool such as a small screwdriver.

Note

ON or OFF indicated in parentheses shows the switch setting position.

Setting the DIP Switches on the Sub Panel

The factory settings are as follows.



1 AGC (Automatic Gain Control) switch

Adjusts the input signal to the optimum printing level.
OFF (OFF): Normally keep this switch set to this position.
ON (ON): When the printout image appears blackish or whitish, select this position to adjust the input signal to the optimum level.

2 IMAGE switch

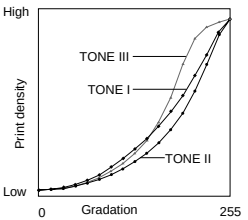
POSI (ON): Normally keep this switch set to this position.
NEGA (OFF): Makes negative printouts.

3 SHARPNESS switch

SOFT (ON): Normally keep this switch set to this position.
HARD (OFF): Obtains greater sharpness of printouts.

4, 5 GAMMA switch

Sets the printing tone to one of TONE I, TONE II or TONE III.
The diagram below shows the curve of each tone for your reference.
When you set the GAMMA switch 5 to the OFF position (TONE III), TONE III is selected regardless of the setting of the GAMMA switch 4 position.



6 POSTFEED switch

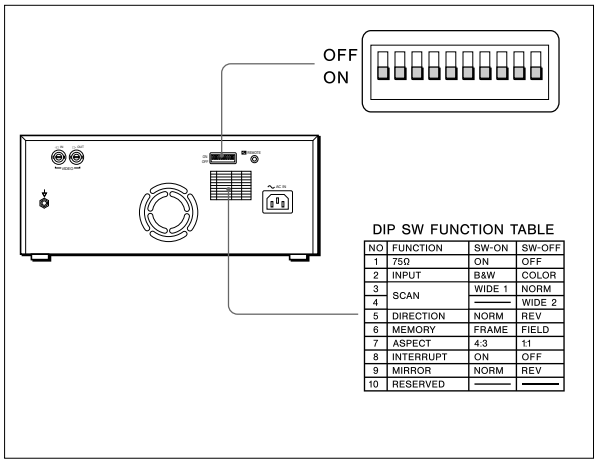
ON (ON): Feeds out extra blank paper once a picture has been printed.
OFF (OFF): Does not feed out extra blank paper once a picture has been printed. To save paper by feeding only a short length of paper after printing a picture, set to this position. You can make more printouts per roll of printing paper, but you have to feed the paper using the FEED button and tear off the paper by yourself.

7, 8 RESERVED switches

Keep this switch set to ON.

Setting the DIP Switches on the Rear Panel

The factory settings are as follows.



DIP SW FUNCTION TABLE

NO	FUNCTION	SW-ON	SW-OFF
1	75Ω	ON	OFF
2	INPUT	B&W	COLOR
3	SCAN	WIDE 1	NORM
4		——	WIDE 2
5	DIRECTION	NORM	REV
6	MEMORY	FRAME	FIELD
7	ASPECT	4:3	1:1
8	INTERRUPT	ON	OFF
9	MIRROR	NORM	REV
10	RESERVED	——	——

1 75Ω switch

ON (ON): When nothing is connected to the VIDEO OUT connector, set the switch to this position.
OFF (OFF): When a video monitor or other video equipment is connected to the VIDEO OUT connector, set the switch to this position.
When you connect two printers to one video equipment, set the 75Ω switch of one of the printer to ON, and the other to OFF.

2 INPUT switch

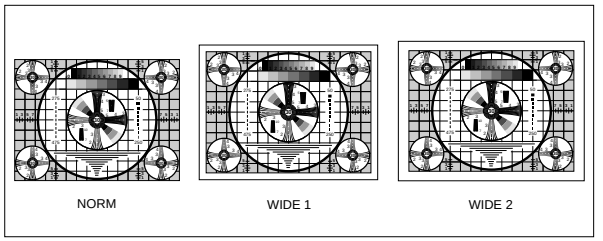
B & W (ON): When the signal to be printed is black and white, set the switch to this position.
COLOR (OFF): When the signal is color, set the switch to this position.

3, 4 SCAN size switches

Set the printout range. The printout range is widened in the NORM, WIDE 1, and WIDE 2 order.
NORM (Switch 3: OFF): Prints only the image displayed on the standard screen size of the video monitor.
WIDE 1(Switch 3: ON): Prints when the signal scans beyond the edge of the standard monitor screen.
WIDE 2 (Switch 4: OFF): To further extend the range, select this setting.

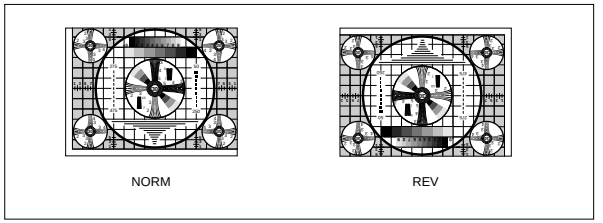
Note

If the SCAN switch 4 is set to the OFF position (WIDE 2), WIDE 2 is selected regardless of the setting of the SCAN switch 3 position.



5 DIRECTION switch

Selects whether the top or the bottom of the screen is to be printed first.
NORM (ON): Normally keep this switch set to this setting. Printing is done from the bottom of the screen.
REV (OFF): Printing is started from the top of the screen.



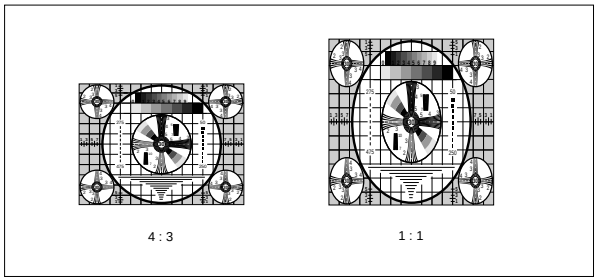
6 MEMORY switch

FRAME (ON): Normally keep this switch set to this position.
FIELD (OFF): When printing fast moving pictures (such as a ball being thrown), the printout may blur. If this happens, set to this position. The printout definition will be poorer, but less blurred.

Setting the DIP Switches (Continued)

7 ASPECT switch

4:3 (ON): Normally keep this switch set to this position.
1:1 (OFF): When the aspect ratio of the video signal is 1:1, set to this position.
The printout will be longer than a printout made at 4:3.



8 INTERRUPT switch

Sets whether the PRINT button is activated to enable interruption of the printing process and capture an image in memory.
ON (ON): Interrupts the printing under way, captures the image displayed, and prints a new picture.
In the SMALL mode, the printer stops printing and captures the first image.
OFF (OFF): Disregards that the PRINT button is pressed during printing and continues the printing under way.
If you press the PRINT button during printing in OFF mode, the alarm buzzer will sound.

9 MIRROR switch

NORM (ON): Normally keep this switch set to this position.
REV (OFF): Prints the right and left sides reversed (mirror image).

10 RESERVED switch

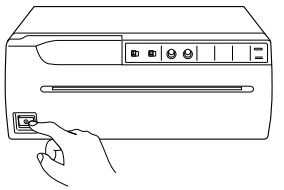
Keep this switch set to ON.

Loading Paper

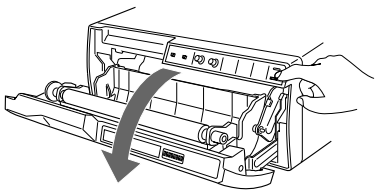
Notes

- Do not fold the paper or touch the printing surface. Any dust on the printing surface will result in poor printing quality.
- Use only paper made specially for the UP-960 series. (See page 49.)

1 Press the power ON/OFF switch to turn on the printer.
The buttons on the front panel will light.



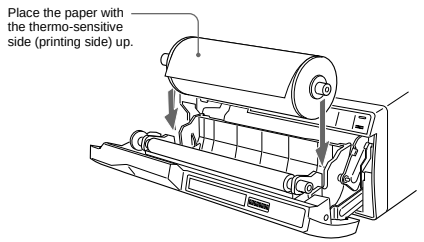
2 Press the OPEN/CLOSE button to open the door panel.



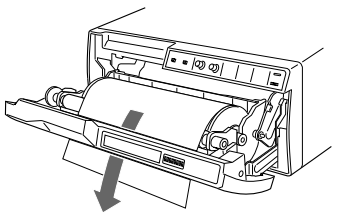
Continue to next page →

Loading Paper (Continued)

3 Place the paper roll in the printer.

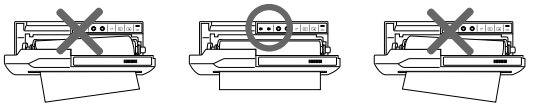


4 Insert the end of the paper end into the paper insertion slot and feed the paper with your hand until its end comes out from the paper outlet



Note

Be sure to remove any slack in the roll when pulling out the paper.



5 Press the OPEN/CLOSE button to close the door panel.
You can also close the door panel simply by pushing it.

Note

After loading the paper roll, press and hold down the FEED button until 15 to 20 cm (6 to 7 7/8 inches) of the paper protrudes and tear it off by yourself.

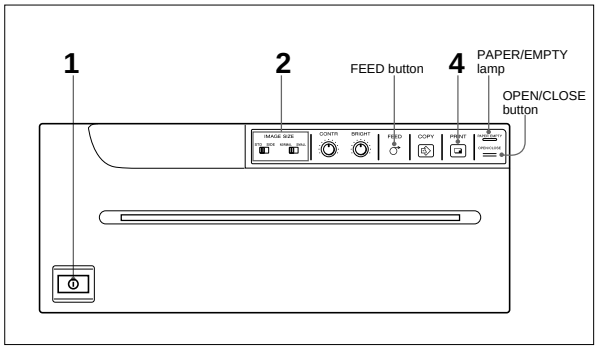
Operation

Printing

Before making printouts

- Are the connections correct? (page33)
- Is the paper roll loaded properly? (page 39)
- Are the DIP switches set correctly? (page 34)
- Is the print source being input?

Making Printouts



1 Press the power ON/OFF switch to turn on the printer.
All buttons on the front panel will light.

Note

Make sure that the PAPER EMPTY indicator is not lit.
If lit, load the paper. (See page 39.)

2 Selecting the printing direction and size.
See “Selecting the Printing Direction/Printing Size”. (See page 43.)

3 Start the video source.
This operation is done using the controls of the video equipment acting as a source.

4 When the image you want to print is on the video monitor, press the PRINT button.
The image displayed at the instant you press the PRINT button is captured into memory and is printed out immediately.

To interrupt printing

Press either OPEN/CLOSE or FEED button while printing. The printer stops printing.

To stop printing and print another picture displayed on the video monitor

To do this, the INTERRUPT setting of the DIP switches must be set to ON. (See page 38.)
Press the PRINT button while printing or copying. The printer stops printing, captures the new image, and starts printing of the new image.
In the SMALL mode, the printer stops printing and captures the first image.

If the printout image is blurred

A rapidly moving image may be blurred when printed. Should this occur, change the MEMORY setting of the DIP switch to FIELD. (See page 37.)

To print in SMALL mode

Press the PRINT button twice. When you press the PRINT button once, the buzzer sounds and the first image is captured. The printer starts printing after the PRINT button is pressed twice.
For detailed information on SMALL mode, see "Selecting Printing Direction/ Printing Size". (See page 43.)

Making copies of the last printout

Press the COPY button. The printer makes a copy of the last printout. The image of the last printout is retained in the printer's memory until you press the PRINT button again or turn the power off.

To copy in different sizes

You can copy the last printout in different sizes.
Before pressing the COPY button, select the printing size as described in "Selecting the printing size" (See page 43.)

Notes

- If you press the COPY button immediately after turning the power on, the alarm buzzer will sound as nothing is stored in memory.
- In the SMALL mode (page 43), if you press the COPY button after you have pressed the PRINT button only once, the alarm buzzer will sound and the printer will not copy.

To make multiple copies of the same printout

Press the COPY button as many times as necessary (maximum 11 copies including the first printout) while printing or copying the first printout. Each time you press the COPY button, the short buzzer sounds.

To interrupt copying

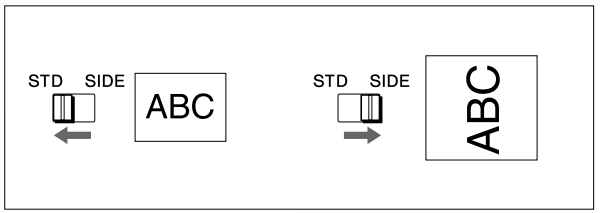
Press either OPEN/CLOSE or FEED button.

Selecting the Printing Direction/Printing Size

You can make variations of printouts using the IMAGE SIZE selectors and the DIP switches.

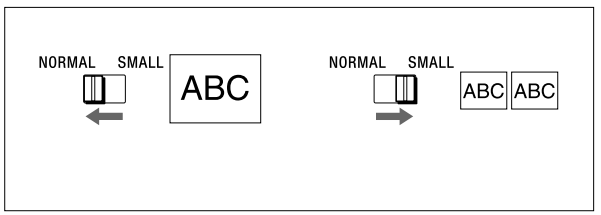
Selecting the printing direction

You can select the vertical or horizontal direction using the IMAGE SIZE STD/ SIDE selector.
To print in the vertical direction: Set to STD.
To print in the horizontal direction: Set to SIDE.



Selecting the printing size

You can print in normal or small size by changing the IMAGE SIZE NORMAL/ SMALL selector.
To print in normal size: Set to NORMAL.
To print in small size: Set to SMALL.

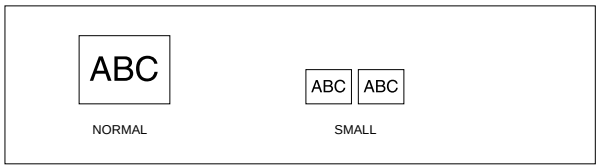


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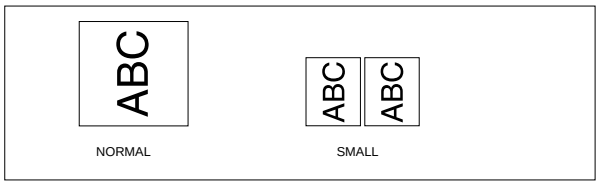
Printing (Continued)

Variations of printouts

STD (standard) mode



SIDE mode

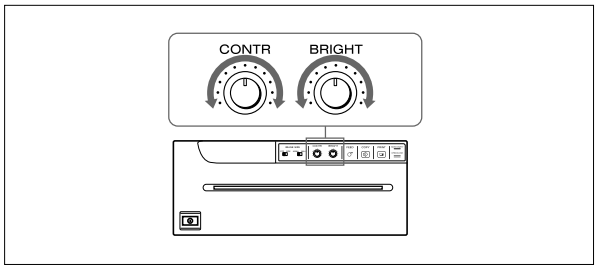


In addition to printouts introduced above, you can make the following variations by changing the DIP switch settings.

- Making negative printouts. (See page 34.)
- Making mirror image printouts. (See page 38.)
- Making printouts upside down. (See page 37.)

Adjusting the Contrast and Brightness

You can adjust the contrast and brightness of the printout.



To adjust the contrast

You can adjust the contrast of printouts using the CONTR control.
To make the contrast stronger: Turn the CONTR control clockwise.
To make the contrast weaker: Turn the CONTR control counterclockwise.

To adjust the brightness

You can adjust the brightness of printouts using the BRIGHT control.
To make the brightness brighter: Turn the BRIGHT control clockwise.
To make the brightness darker: Turn the BRIGHT control counterclockwise.

Note

You cannot adjust the image once it has been captured in memory. Restore an image after adjustment.

Remotely Controlling the Printer

You can remotely control the printer using the RM-91 remote control unit or the FS-20 foot switch connected to the REMOTE connector on the rear panel.

Since the button on the remote control unit or foot switch functions exactly same as the PRINT button, pressing either of them results in an image being captured and immediately printed, when the INTERRUPT switch 8 of the DIP switches on the rear panel is set to ON. (See page 38.)

Precautions

On the safety

- Check the operating voltage before operation.
  Operate the unit only with a power source specified in the “Specifications”.
- Stop operation immediately if any liquid or solid objects fall into the cabinet. Unplug the unit and have it checked by qualified personnel.
- Unplug the unit from a wall outlet if you will not be using it for a long time. Disconnect the power cord by grasping the plug. Never pull the cord itself.
- Do not disassemble the cabinet. Refer servicing to qualified personnel only.
- Do not touch the cutting blade of the printer.
- Keep fingers clear of paper lid assembly and paper cutting blade when paper lid is closing.
- Connect the power plug of the printer to a wall outlet that is safely grounded.

On operation

Do not turn the power off while the printer is printing. The thermal head may be damaged.

On printer carriage

Do not carry and move the printer when a paper roll is being placed in the printer. Doing so may cause malfunction.

On installation

- Place the printer on a level and stable surface during operation.
- Do not install the printer near heat sources. Avoid locations near radiators or air ducts. Also do not subject to direct sunlight or excessive dust, humidity, mechanical shock or vibration.
- Provide adequate air circulation to prevent heat buildup. Do not place the printer on surfaces such as rugs, blankets, etc., or near materials such as curtains and draperies.
- If the printer is subjected to wide and sudden changes in temperature, such as when it is moved from a cold room to a warm room or when it is left in a room with a heater that tends to produce large amounts of moisture, condensation may form inside the printer. In such cases the printer will probably not work properly, and may even develop a fault if you persist in using it. If moisture condensation forms, turn off the power and allow the printer to stand for at least one hour.

Maintenance

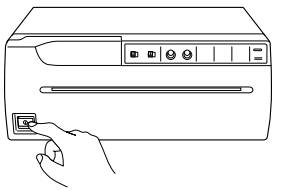
Cleaning the cabinet

Do not use strong solvents to clean the printer. Thinner or abrasive cleansers will damage the cabinet.

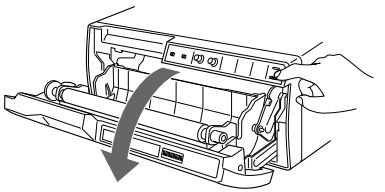
Cleaning the thermal head

If the printout is dirty or white stripes appear on the printouts, clean the thermal head using the supplied cleaning sheet.

1 Press the power ON/OFF switch to turn on the printer.



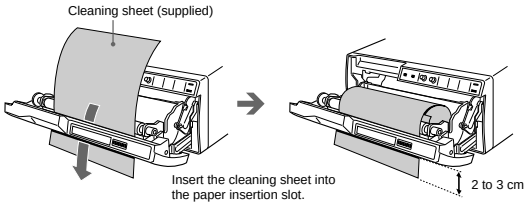
2 Press the OPEN/CLOSE button to open the door panel.
Remove the paper roll if loaded in the printer.



Continue to next page →

Precautions (Continued)

3 Insert the cleaning sheet, with the black surface facing down, into the paper insertion slot and feed the paper with your hands until the end comes out from the paper outlet.



4 Press the OPEN/CLOSE button and keep it pressed.
The door panel closes and the printer starts cleaning the head.
When the buzzer sounds and the printer starts ejecting the cleaning sheet, release the OPEN/CLOSE button.

5 Press the OPEN/CLOSE button to open the door panel when the head cleaning is completed and the printer stops ejecting the cleaning sheet, and remove the cleaning sheet.

Notes

- Do not press the PRINT button while the cleaning sheet is in the printer.
- Clean the head only when necessary. If you clean the head too often, it may cause a malfunction.

Paper

Type of paper

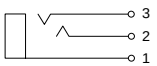
- Use only paper specified for this printer. The use of other paper may result in reduced printer performance and poor print quality.
- The following types of paper are available.
  — UPP-210SE (Normal)
  — UPP-210HD (High density)

Storing paper

- Store unused or printed paper in a cool, dark place (below 30°C or 86°F). We recommend that you store printed paper in a polypropylene pouch.
- Do not store unused or printed paper in hot or humid place.
- Do not leave unused or printed paper in direct sunlight or other bright places for extended periods.
- Do not allow any volatile organic solvent or vinyl chloride to touch the printed paper. Alcohol, plastic tape or film will cause the printout to fade.
- To attach the printed paper to another piece of paper, use double-sided adhesive tape, or water-based or solid glue.
- Do not stack printed paper on or under a diazo copy sheet. The printout may become blackened.

Specifications

Thermal head
Thin-film thermal head (with built-in drive IC) 1280 dots
Gradation
256
Picture elements
EIA: 1280 × 507 dots
CCIR: 1280 × 607 dots
Print size (at factory setting)
STANDARD mode and WIDE 1 mode
EIA: 190 × 144 mm
CCIR: 190 × 142 mm
SIDE mode
EIA: 243 × 184 mm
CCIR: 243 × 181 mm
Printing speed
EIA: About 10 seconds/screen (aspect ratio 4:3)
CCIR: About 12 seconds/screen (aspect ratio 4:3)
Picture memory
2048 × 1024 × 8 bits
Input/output connectors
VIDEO IN (BNC)
EIA or CCIR Composite video signals
1.0 Vp-p, 75 ohms/high-impedance (EIA/CCIR automatically discriminated)
VIDEO OUT (BNC)
EIA or CCIR Composite video signals
1.0 Vp-p, 75 ohms, loop-through
REMOTE (stereo minijack)



1 GND
2 PRINT SIGNAL (TTL)
When the LOW pulse over 100 msec is input, printing starts.
3 PRINT BUSY (TTL)
Goes HIGH during printing.

Power requirements and consumption
120 V AC, 50/60 Hz, 2.4 A
220 to 240 V AC, 50/60 Hz, 1.3 A
Operating temperature
5°C to 35°C (41°F to 95°F)
Operating humidity
20 % to 80 % (no condensation allowed)
Storage and transport temperature
-20°C to 60°C (-4°F to 140°F)
Storage and transport humidity
20 % to 90 % (no condensation allowed)
Dimensions
Approx. 316 × 132 × 305 mm (w/h/d) (12½ × 5¼ × 12⅛ inches)
Mass
Approx. 8 kg (17 lb 10 oz), Main unit only
Supplied accessories
Paper roll (UPP-210HD) (1)
BNC – BNC connecting cable (1)
AC power cord (1)
Head cleaning sheet (1)
Instructions for Use (1)

Design and specifications are subject to change without notice.

Troubleshooting

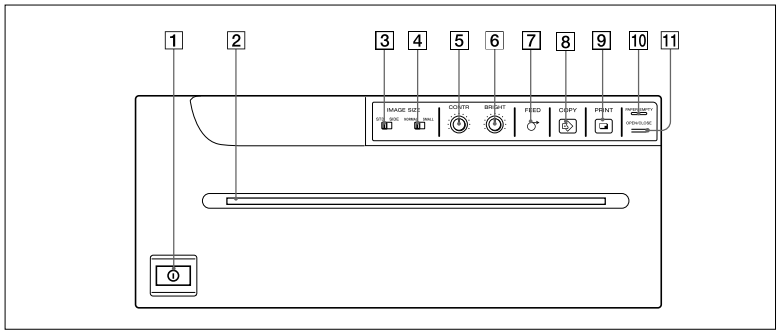
The following troubleshooting checks will help you correct the most common problems you may encounter with your printer. Before proceeding with these trouble check, first check that the power cord is firmly connected. should the problem persist, unplug the printer and contact your Sony dealer or local authorized Sony service facility.

Symptom	Cause/remedy
White specks on first few printouts.	When printing with a newly inserted roll of paper, dust on the surface of the paper may cause white specks on the printouts. → Feed the paper by pressing the FEED button until clean paper appears, then tear off the paper by your hand.
Printing does not start when you press the PRINT or COPY button.	• Paper does not feed. → Is the paper slack? (page 40) → Is the power turned on? → Are all connections correct? (page 33) → Did you press the PRINT button twice in SMALL mode? (page 42) • When the alarm buzzer sounds: → Has the thermal head overheated? The thermal head may overheat when the printer prints dark image continuously. In such a case, the PAPER/EMPTY indicator blinks. Wait until the head cools down. → Is the video signal of the picture input? → Is the paper loaded correctly? • Paper feeds, but printing does not start. → Is the paper loaded with the thermo-sensitive side up? (page 40)
Black borders or missing portions around the printout.	This may result according to the video signal input to the printer. → Change the setting of SCAN switches. (page 37)
Paper jam	• Open the door panel by pressing the OPEN/CLOSE button, then slowly pull out the jammed paper slowly and remove it. • There is condensation within the unit. → Moving the unit suddenly from a cold place to a warm place often results in condensation forming. In the event of condensation forming, remove the paper, turn off the power and leave the unit for about one to two hours.
Printout is dirty.	The thermal head is dirty. → Clean the thermal head with the supplied head cleaning sheet. (page 47)
The printer stops printing when it prints continuously dark images. (The alarm buzzer sounds.)	This is likely to occur when the printer continuously prints 15 or more dark pictures. In such a case, the buzzer sounds. This is because there is the protective circuit that guards against heat buildup of the thermal head. Stop printing for a while.
White lines or small letters on the screen are not printed clearly.	Is the INPUT switch of the DIP switches to B & W (ON) when the input signal is a black and white signal? (page 36)
Small squares appear over the whole screen.	Is the INPUT switch of the DIP switches to COLOR (OFF) when the input signal is a color signal? (page 36)
The printout is too dark or too light.	• Is the 75 ohm switch of the DIP switches set correctly? (page 36) • Is the GAMMA switches of the DIP switches set correctly? (page 35)
The printout seems stretched.	Is the ASPECT switch of the DIP switches set to 1:1? → Set to 4:3. (page 38)

Location and Function of Parts and Controls

For details, refer to the pages indicated in parentheses.

Front



1 ⏻Power ON/OFF switch (39, 41, 47)
Turns the power on.
The FEED, COPY and PRINT buttons light up.

2 Paper feeder and cutter
Cuts the printing paper.

3 IMAGE SIZE STD (standard)/SIDE selector (43)
Selects the printing direction.

4 IMAGE SIZE NORMAL/SMALL selector (43)
Selects the printing size.

5 CONTR (contrast) control (45)
Adjusts the contrast of the printouts.

6 BRIGHT (brightness) control (45)
Adjusts the brightness of the printouts.

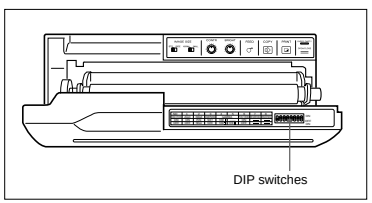
7 FEED button (40, 41, 42)
Press to feed the paper. The paper feeds as long as the FEED button is held down. Pressing this button during printing results in interrupting the printing.

8 COPY button (42)
Prints another copy of the previous printout.

9 PRINT button (41, 42)
Prints the picture currently displayed on the video monitor. The picture displayed when you press the PRINT button is stored in memory.

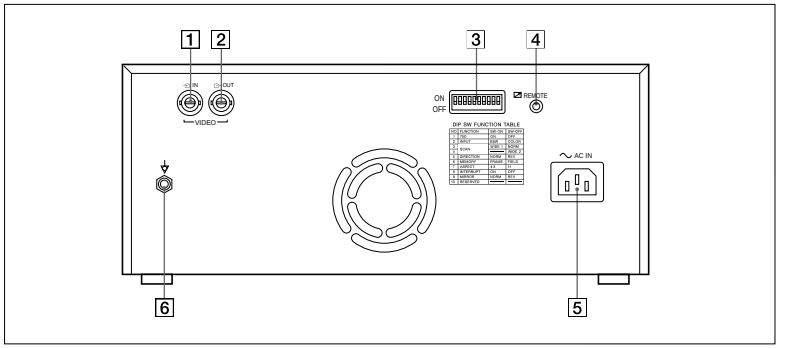
10 PAPER EMPTY indicator (41)
Lights when the printer is out of paper.

11 OPEN/CLOSE button (39, 40, 41, 42, 47, 48)
Opens or closes the door panel. Also, interrupts printing midway.
When the door panel is open, the following sub panel appears.



For details, see page 34.

Back



1 VIDEO IN (input) connector (BNC type) (33)
Connect to the video output connector of the video equipment.
Refer to “Important safeguards/notice for use in the medical environments” on page 30.

2 VIDEO OUT (output) connector (BNC type) (33)
Connect to the video input connector of the video monitor.
Refer to “Important safeguards/notice for use in the medical environments” on page 30.

3 DIP SW (switches) (36)
Sets the print modes and functions.

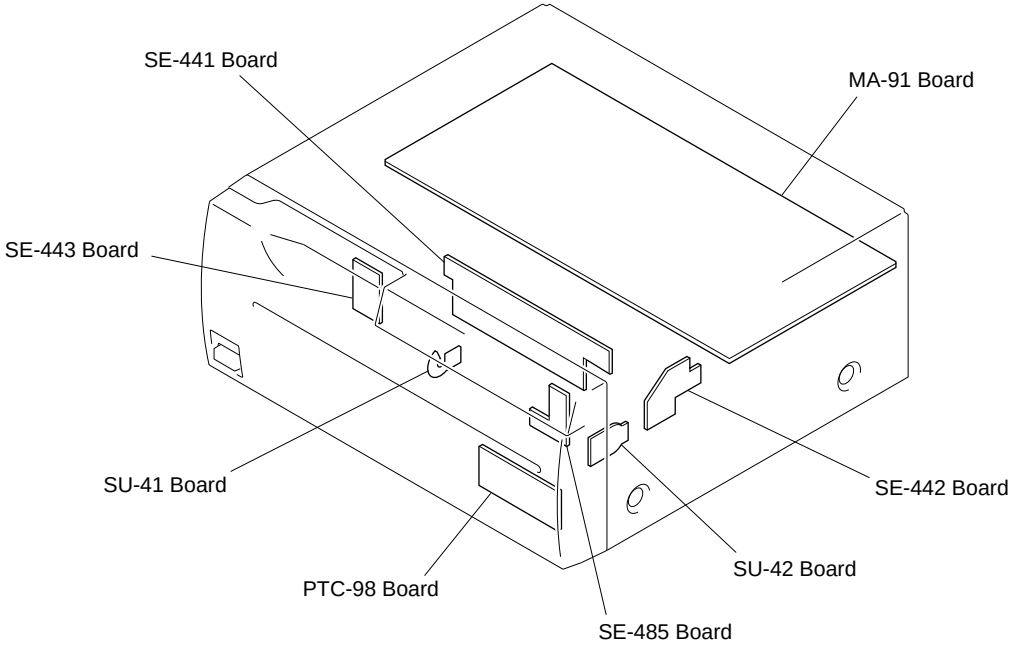
4 REMOTE connector (33, 45)
Connect the optional RM-91 remote commander or the optional FS-20 foot switch for controlling print operation from a distance.

5 ∿AC IN (AC power input) connector (33)
Connect to a wall outlet using the supplied AC power cord.

6 ⏚Equipotential terminal
Used to connect to the equipotential plug to bring the various parts of a system to the same potential.
Refer to “Important safeguards/notice for use in the medical environments” on page 30.

SECTION 2
SERVICE OVERVIEW

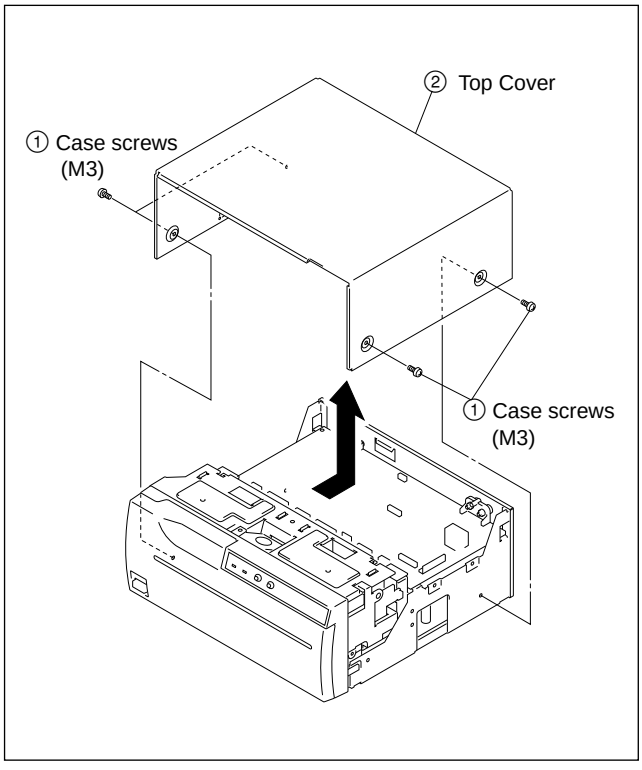
2-1. PC BOARD LOCATION



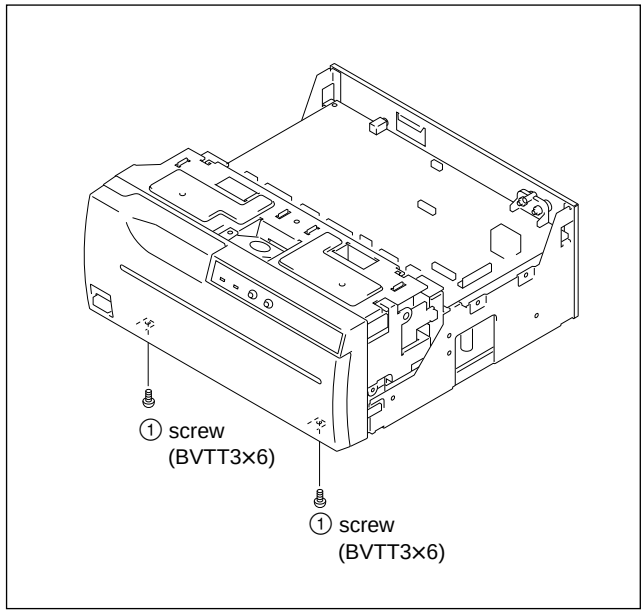
2-2. REMOVAL OF THE COVER AND THE PANELS

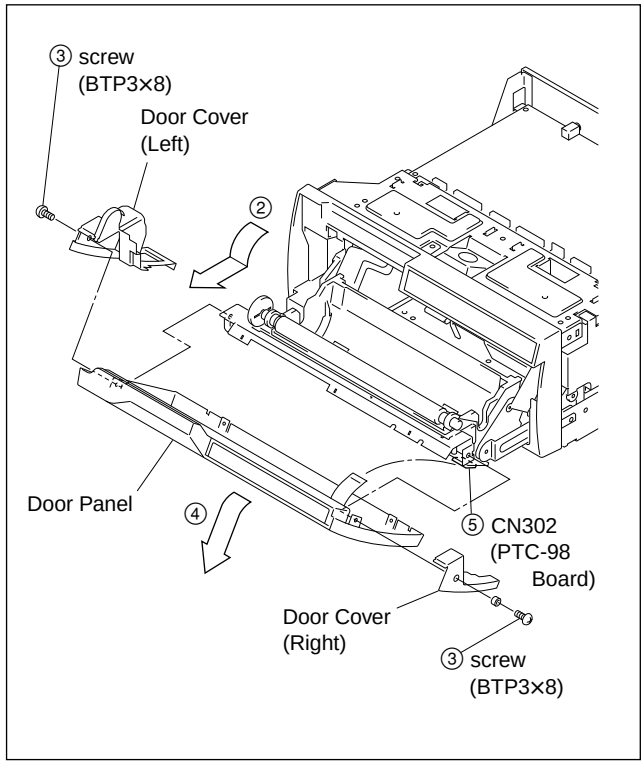
NOTE :
Remove the cover and the panels in the numerical order as shown.

2-2-1. Removal of the Top Cover

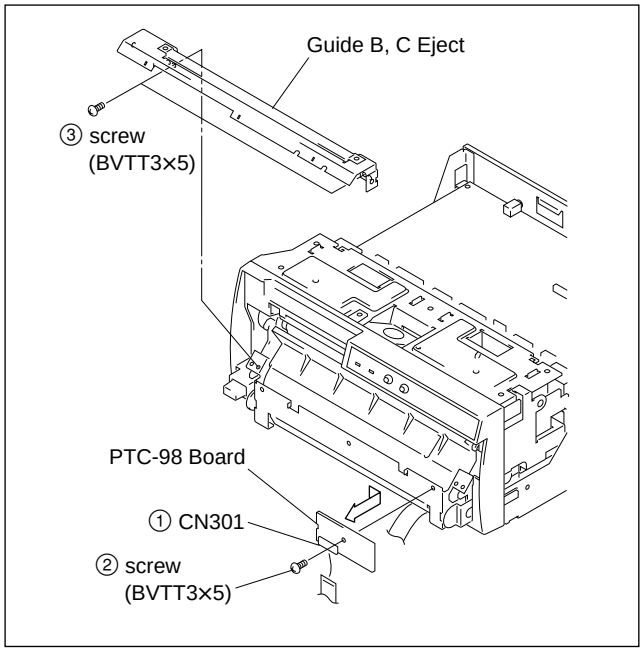


2-2-2. Removal of the Door Panel

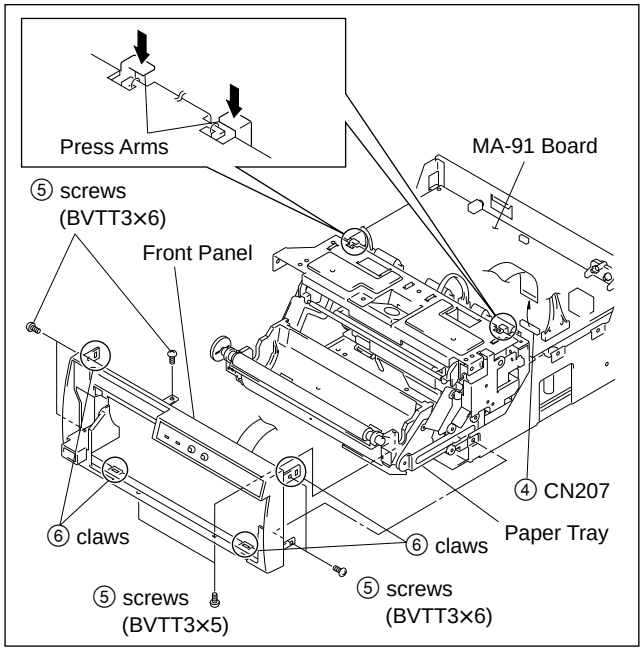




2-2-3. Removal of the Front Panel

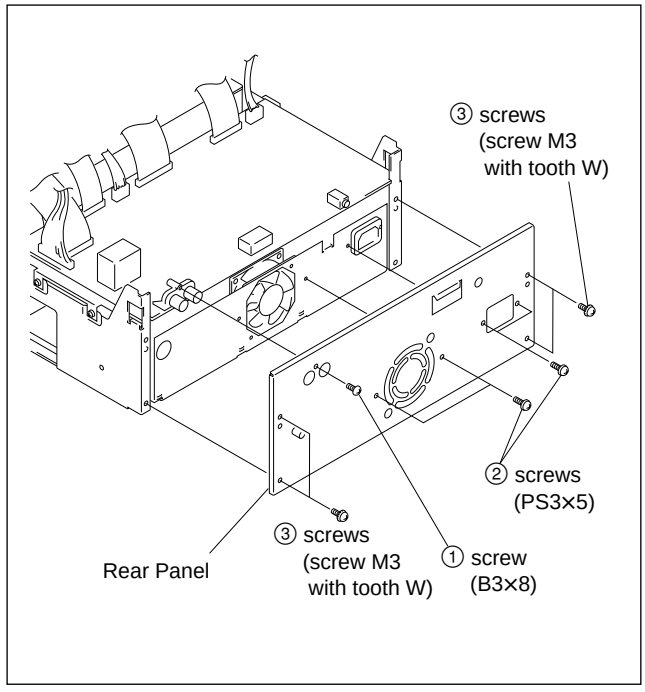


NOTE :
Open the paper tray before removing the front panel. For opening the paper tray, pull the tray close with the press arm pressed.



Note on Front Panel Installation :
Be sure to insert the four claws ⑥ in position.

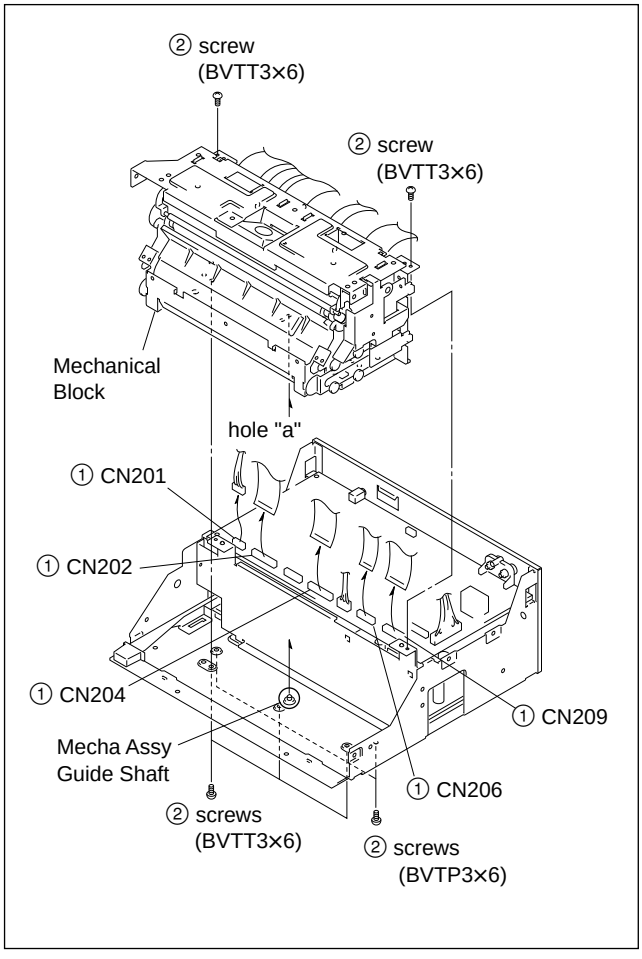
2-2-4. Removal of the Rear Panel



2-3. REMOVAL OF THE MAIN PARTS

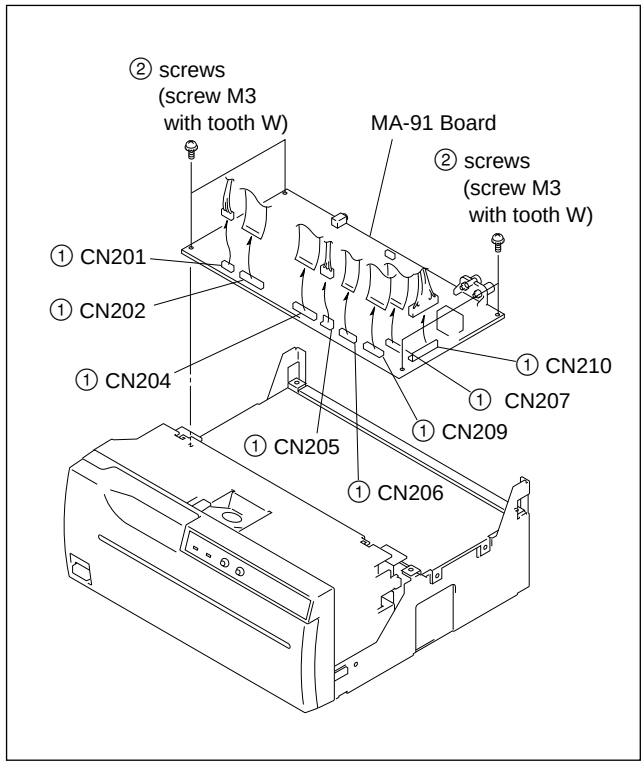
NOTE :
Remove the main parts in the numerical order as shown.

2-3-1. Removal of the Mechanical Block

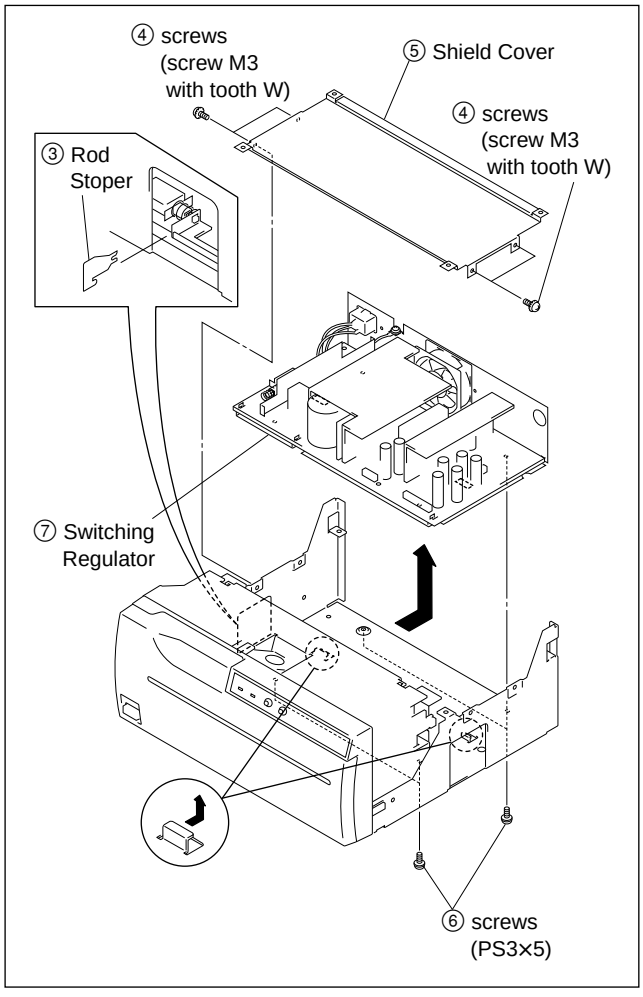


Note on Mechanical Block Installation :
Insert the mechanical assy guide shaft on the chassis into the hole "a" of the mechanical block.

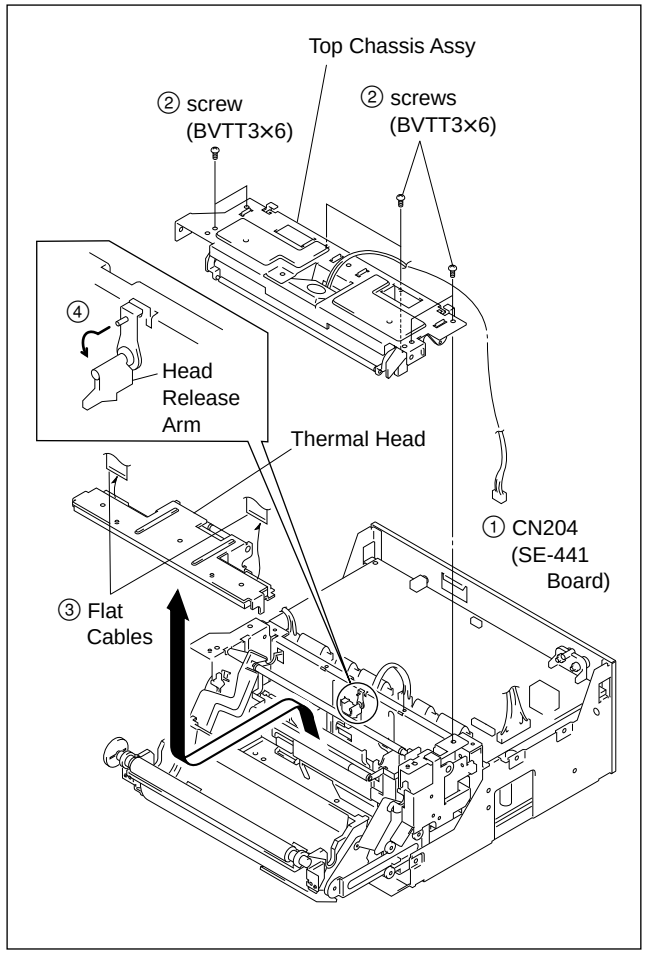
2-3-2. Removal of the MA-91 Board and the Switching Regulator



http://getMANUAL.com



2-3-3. Removal of the Thermal Head



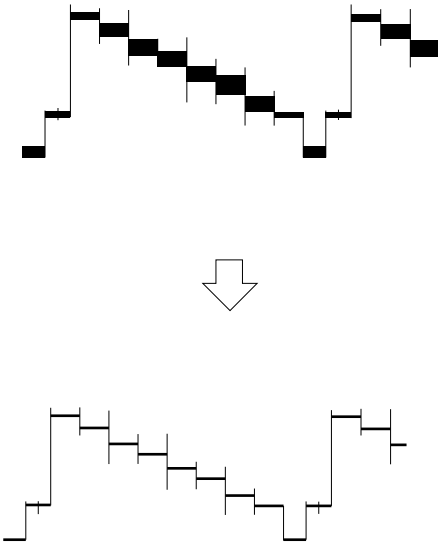
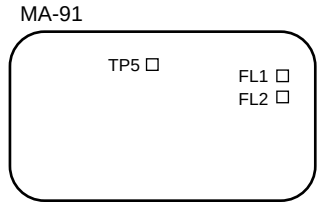
How to rotate the head release arm :
Pull and rotate the arm in the counterclockwise direction to the position of stopper.

SECTION 3
ELECTRICAL ALIGNMENT

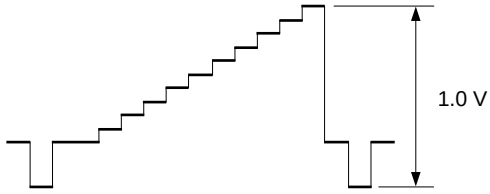
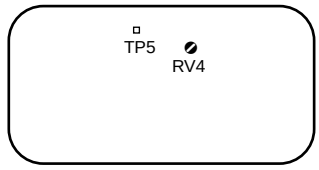
[Equipment Required]

Oscilloscope
Digital voltmeter
Color-bar pattern generator (1410/1411 signal generator)

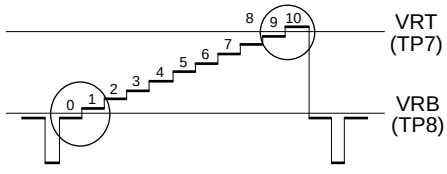
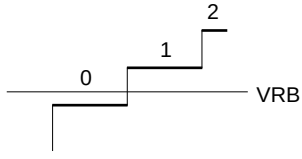
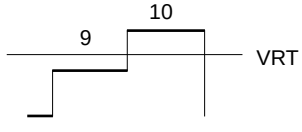
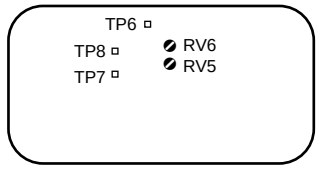
3-1. TRAP ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Input signal NTSC signal color bar (1410 signal generator) PAL signal color bar (1411 signal generator) • Set rear panel DIP switch pin 2 to ON. • Adjust FL1 using NTSC color bar input. Next, adjust FL2 using PAL color bar input.	TP5 (AMP IN)/MA-91 (E-1) Output waveform  The remain of chroma level is the minimum.	⊘ FL1/MA-91 (J-2) ⊘ FL2/MA-91 (J-2) 

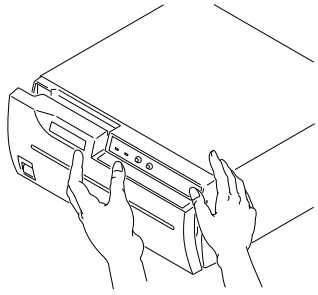
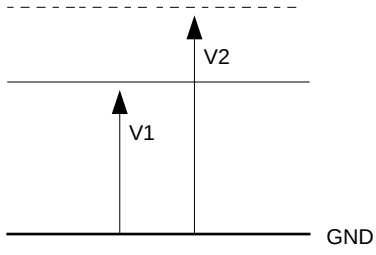
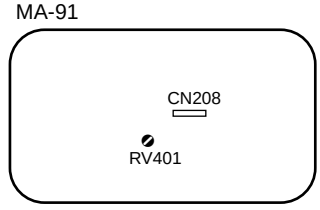
3-2. VIDEO LEVEL ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Input signal 10 step signal NTSC : 1410 signal generator PAL : 1411 signal generator • In case, monitor is not connected, set DIP switch pin 1 on the rear panel to ON, if connected, set to OFF. • Adjust RV4 (AGCOFFCONT) using 10 step signal input.	TP5 (AMP IN)/MA-91 (E-1) Output waveform  Adjust so that video signal level is 1.0 V.	AGCOFFCONT Adjustment ⊘ RV4/MA-91 (G-2) MA-91 

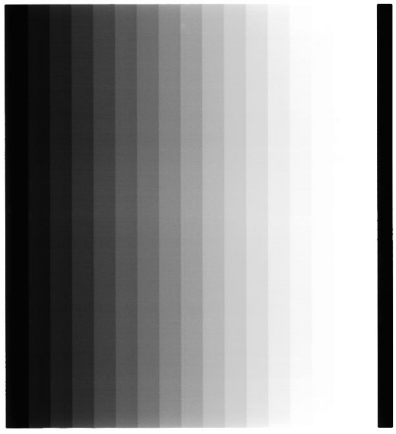
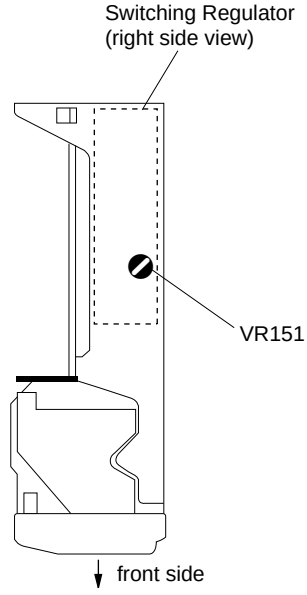
3-3. BRIGHTNESS AND CONTRAST ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Input signal 10 step signal NTSC : 1410 signal generator PAL : 1411 signal generator • In case, monitor is not connected, set DIP switch pin 1 on the rear panel to ON, if connected, set to OFF. • Adjust RV5 (C ADJ) and RV6 (B ADJ) using 10 step signal input. • Set CONT and BRT knobs to the center position on the front panel.	TP6 (AD IN)/MA-91 (E-1) Output waveform  RV6  Adjust so that mid voltage between 0 and 1 is equaled to the VRB voltage. RV5  Adjust so that mid voltage between 9 and 10 is equaled to the VRT voltage.	C ADJ Adjustment ⊘ RV5/MA-91 (F-2) B ADJ Adjustment ⊘ RV6/MA-91 (F-2) MA-91 

3-4. DOOR LOCK SENSOR ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Input signal : nothing • Open the door while it is pushed by hand. At that time (locked condition), measure the voltage and adjust RV401.	 CN208 (pin 9)/MA-91 (G-3) Output voltage  V1 : The voltage when the paper tray is locked by hand during opening or closing of it. (Approximately: 7.5 V) V2 = V1+2.0V Adjust so that the voltage of CN208 (pin 8) becomes V2.	⊘ RV401/MA-91 (E-4) 

3-5. HEAD VOLTAGE ADJUSTMENT

Machine condition for adjustment	Specifications	Adjustments
• Input signal: nothing • Turn the power switch to ON while pushing the PRINT and COPY buttons. • Print: Push the PRINT button. • Set all door panel DIP switches to ON. Set all rear panel DIP switches to ON. Set slide switches to NORMAL and STD on the front panel.	 Adjust VR151 so that 17 step signal becomes smoothly gradation.	⊘ VR151 switching regulator 

SECTION 4
CIRCUIT OPERATION DESCRIPTION

OUTLINE
Electrical circuit of UP-960/960CE consists of following blocks.

VIDEO CIRCUIT
TRAP filter and AGC process are performed against input video signal and A/D converted.

MEMORY & HEAD CONTROL G/A
Print data is fetched frame memory (DRAM). Image data on the memory is converted into PWM and sent it to the thermal head.

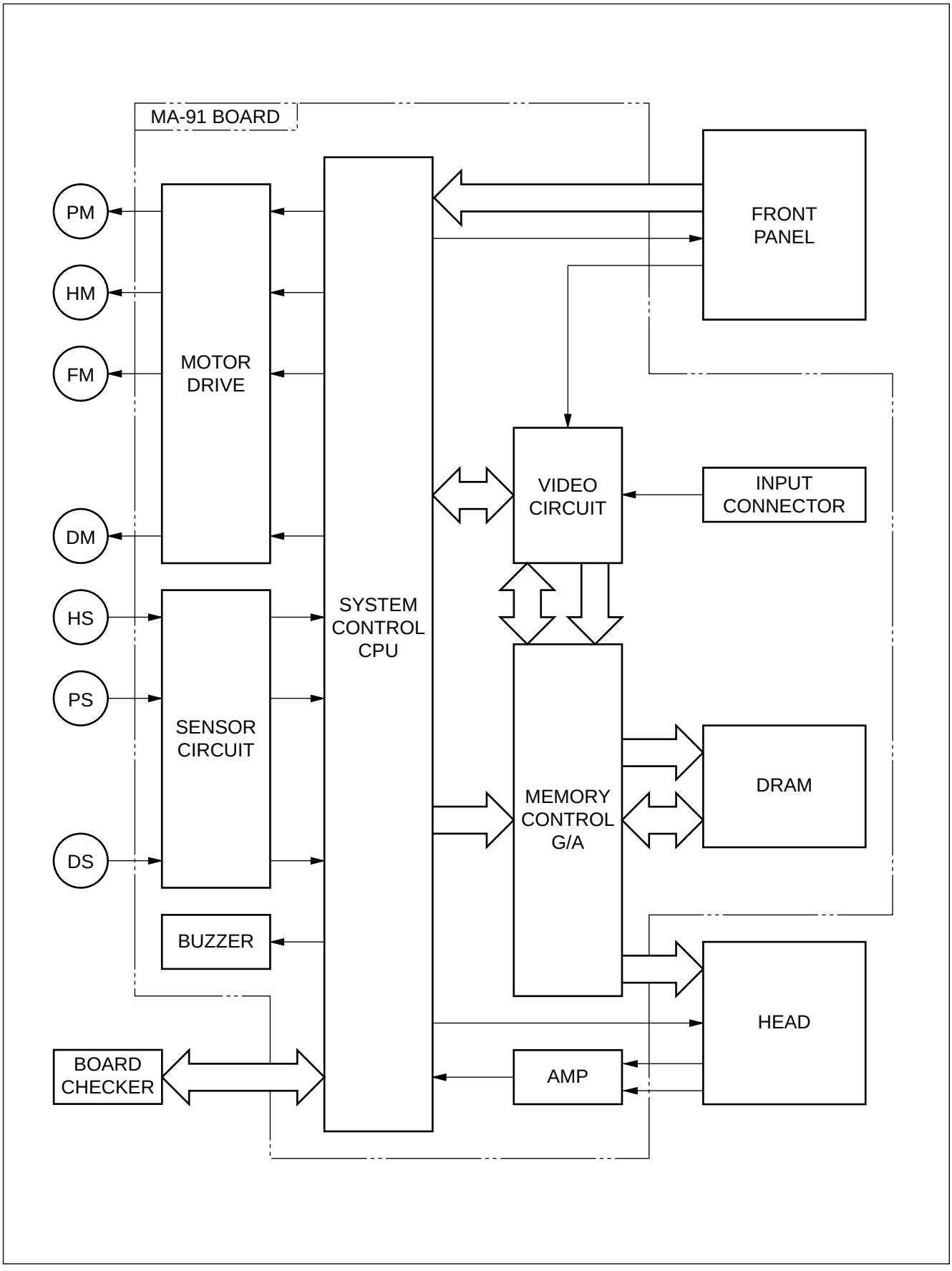
FRAME MEMORY (DRAM)
Print data is memorized.

SYSTEM CONTROL CPU
Various blocks are watched and controlled.

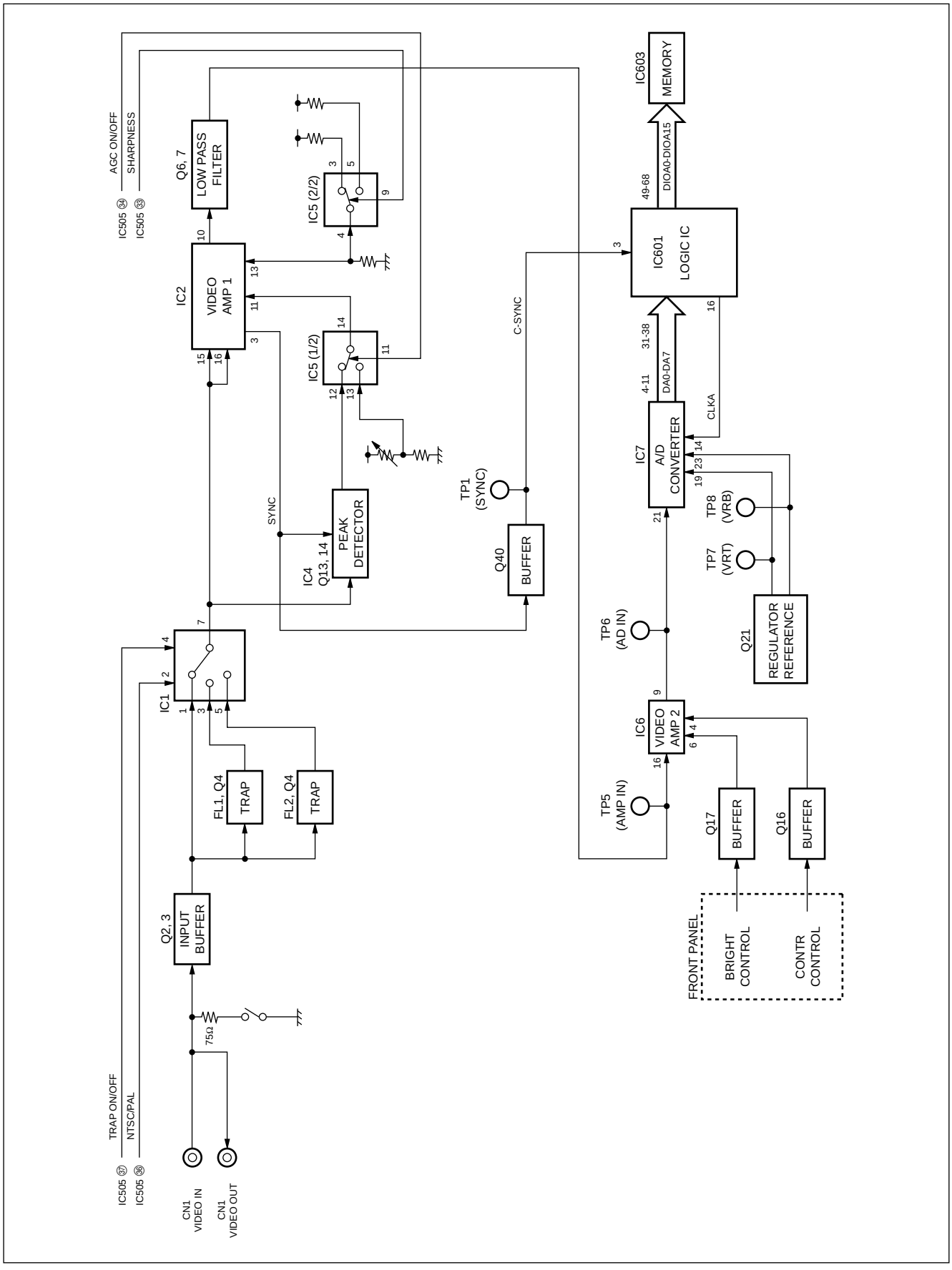
MOTOR DRIVE
Motors of head, platen, cutter, fan and door are driven according to the command from system control.

SENSOR CIRCUIT
Sensor values of head, paper, cutter, door and etc. are detected.

OVERALL


MA-91 BOARD
PM
HM
FM
DM
HS
PS
DS
MOTOR DRIVE
SENSOR CIRCUIT
BUZZER
BOARD CHECKER
SYSTEM CONTROL CPU
FRONT PANEL
VIDEO CIRCUIT
INPUT CONNECTOR
MEMORY CONTROL G/A
DRAM
HEAD
AMP

VIDEO BOARD (MA-91)



4-1. VIDEO CIRCUIT

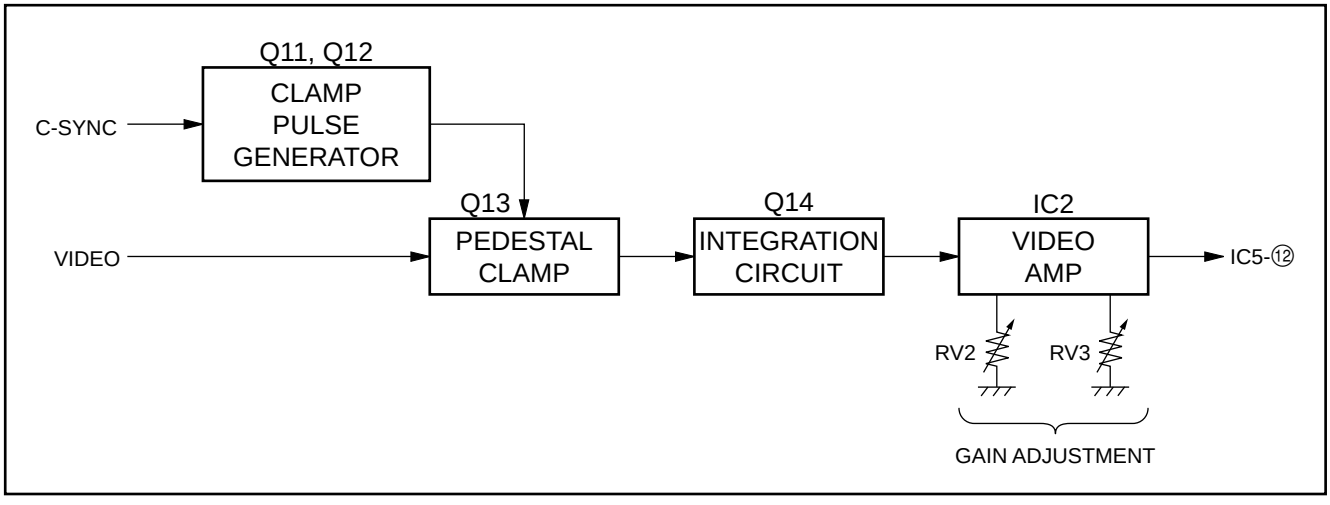
4-1-1. Input Trap Filter Circuit

The composite video signal is inputted to MA-91 board from BNC connector (CN1-VIDEO IN). 75 ohm termination is turned ON/OFF by dip switch (S501 pin 1). After that, it is divided three signal systems via input buffer, the signal passed through trap filter (FL1) for NTSC, the signal passed through trap filter (FL2) for PAL, no processed signal is inputted to the analog switch (IC1 pins 1, 3 and 5). Selection of signal is performed by system control (IC505) and inputted to the video amplifier 1 (IC2 pins 15 and 16).

4-1-2. Sharpness, AGC Circuit and C-SYNC Signal

The signal from analog switch (IC1) is divided two systems, one is inputted to the video amplifier 1 (IC2 pins 15 and 16), another is inputted to the peak detection circuit for AGC. Sharpness is switched Soft and Hard by changing the voltage that is inputted to the video amplifier 1 (IC2 pin 13). The voltage is switched by analog switch (IC5) and controlled by system control (IC505). AGC is performed by using contrast amplifier in the video amplifier 1 (IC2). When setting AGC to ON, the voltage is peak voltage of input video signal that is obtained by peak detection circuit (Q13, Q14, IC4), when setting AGC to OFF, the reference voltage is outputted from analog switch (IC5) by controlling system control (IC505), both voltages are fed back to video amplifier 1 (IC2 pin 11) and controls gain of amplifier. C-SYNC signal is outputted from video amplifier 1 (IC2 pin 3). Peak detection circuit for AGC is also used this C-SYNC signal.

Peak Detection Circuit



4-1-3. Brightness, Contrast Control and A/D Conversion

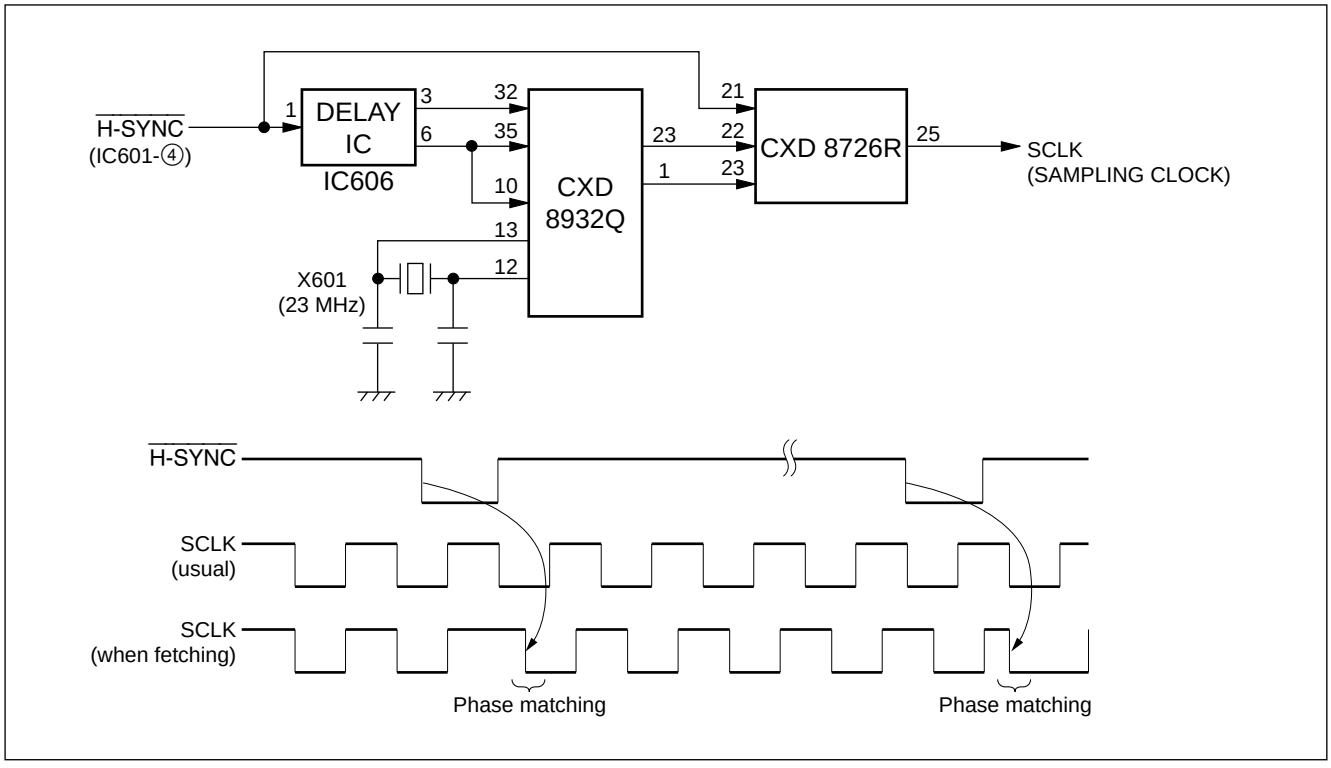
The video signal outputted from video amplifier 1 (IC2 pin 10) is inputted to video amplifier 2 (IC6 pin 16) via low pass filter (Q6, Q7). The voltages obtained by each volume on the front panel are inputted to video amplifier 2 (IC6 pins 4 and 6). And BRIGHTNESS and CONTRAST adjustments are performed according to this voltages. After that, adjusted signal outputted from video amplifier 2 (IC6 pin 9) is converted to digital signal at A/D converter (IC7) and it is stored to the memory.

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4-2. OSCILLATOR CIRCUIT

The clock (IC604-1) is generated by attaching crystal oscillator (23 MHz) to IC604 outside. This clock is matched the phase at rising down of H-SYNC when fetching the video signal. At that time, the clock signal is disordered. It is corrected at the circuit (IC601, IC605) to reduce the noise. Memory control and etc. are performed by this clock (IC601 pin 25) as master clock.

Oscillator Circuit



4-3. IC601 PERIPHERAL CIRCUIT

IC601 consists of following blocks.

(1) Register for serial data storing from system control (IC505)
- ① Various mode setting ——— 22 byte
- ② SYNC signal processing parameter ——— 4 byte
- ③ Coefficient for scaling calculation ——— 128 byte
- ④ Gamma data ——— 34 byte

(2) Frame memory write and read control

(3) Thermal head control

(4) SYNC signal processing circuit

(5) 1 line memory (for print)

(6) Image scaling calculation circuit

Each block operation is decided by serial data from system control (IC505) and mode switching terminal.

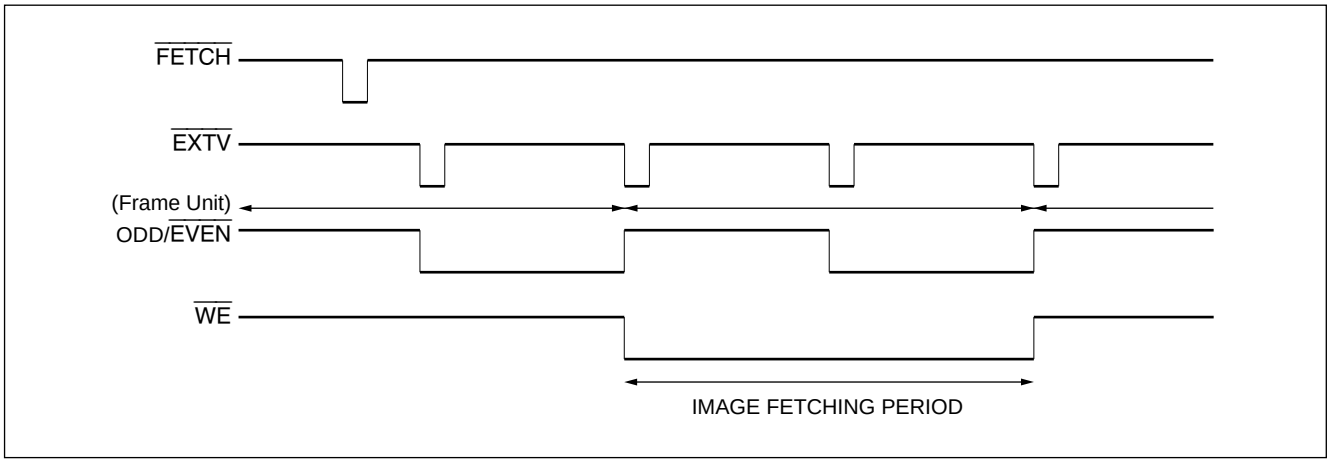
4-3-1. Serial Data Reading from System Control

The system control (IC505) has four kinds of data to send IC601. There are respectively registers for storing. Which register is selected by combination of “H” and “L” inputs to IC601 pins 137 and 138.

Pin 137	Pin 138	Register to be selected
H	H	Image scaling calculation circuit
H	L	Gamma data
L	H	SYNC signal processing parameter
L	L	Various mode setting

4-3-2. Writing to the Frame Memory

Image data of next one frame is written in frame memory by inputting fetch pulse from system control to IC601 pin 125. UP-960/960CE use a 16 M-DRAM (1 word is 16 bit) as image memory. The data is written in DRAM every two sampling data (16 bit). Memory space is address space of 1024 × 2024 and depth direction of one address is 16 bit.



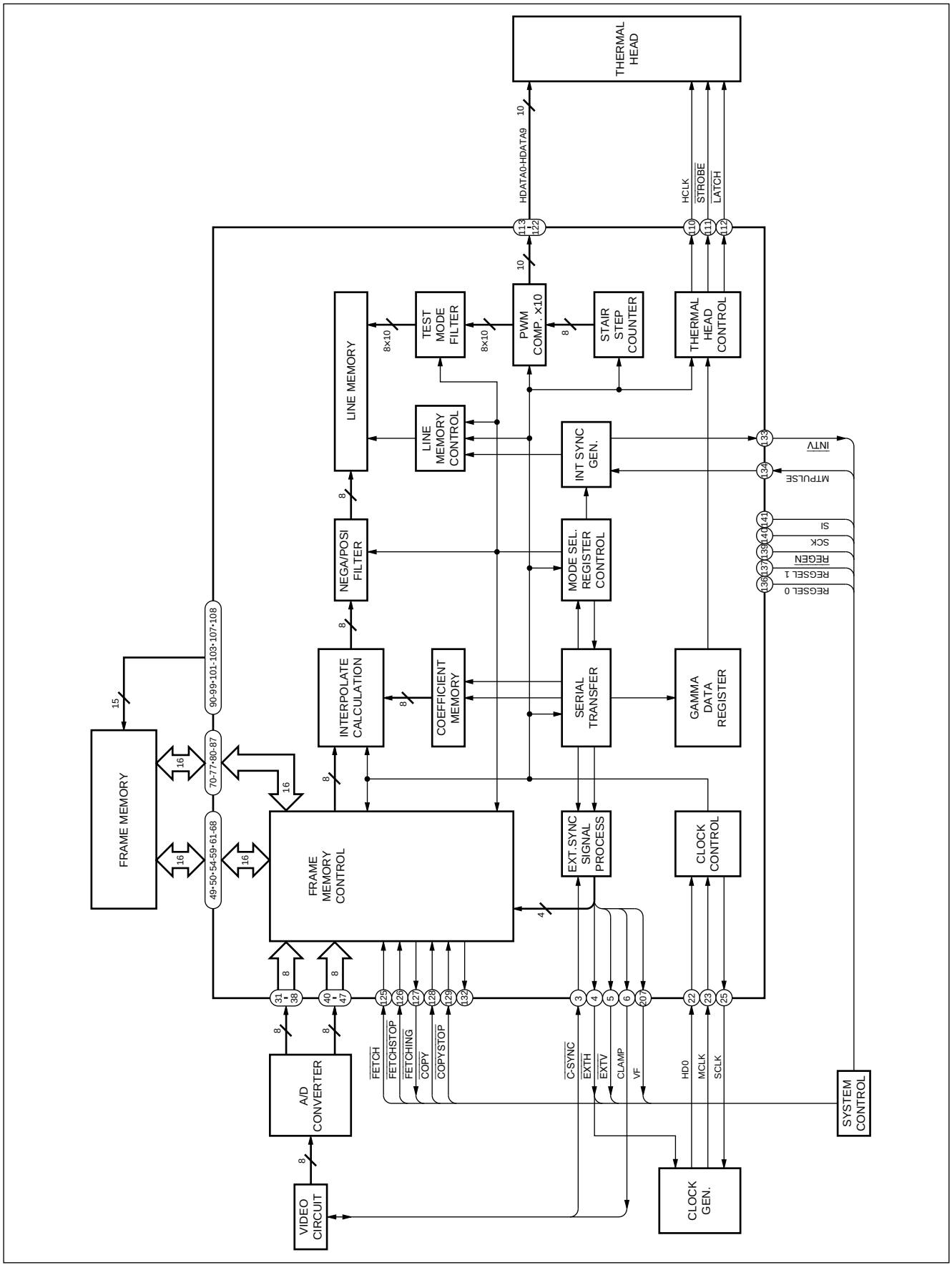
4-3-3. Transfer from Frame Memory to Line Memory

If COPY pulse is inputted from system control to IC601 pin 128, IC601 performs COPYING signal to “L”, and the print operation is started. In order to print, selected one line data from frame memory is transferred to one line memory in IC601. IC601 reads necessary print data from frame memory. Its print range and print character direction are indicated by mode set of system control. This data is scaled and stored at one line memory. Transfer of the data is performed every “L” period of INTV signal. INTV signal is pulse for print timing of one line. It is made at IC601 and locked approximately 10 ms period.

4-3-4. Thermal Head Control and One Line Memory

All thermal head control is performed by IC601. Built-in one line memory is used when transferring a print data to the thermal head. Refer to the thermal head section for the detail.

IC601 BLOCK DIAGRAM



4-4. SYSTEM CONTROL SECTION

System control section consists of IC505 (microcomputer) mainly and processes the following.

4-4-1. Watch of Various Keys

IC505 watches PRINT, OPEN/CLOSE, COPY and FEED keys of front panel and door panel. Keys are all L active.

Example) PRINT key

IC505 pin 15	PRINT key condition
L	Pushed
H	Not pushed

4-4-2. Watch of Various Function Switches

IC505 watches settings of various function switches and reflects its settings to the operations.

Front slide SW	Function	Operation
IC505 pin 88	SMALL	L : SMALL H : NORMAL
IC505 pin 89	SIDE	L : SIDE H : STANDARD

Front DIP SW	Function	Operation
IC505 pin 23	AGC	L : ON H : OFF
IC505 pin 24	IMAGE	L : POSI H : NEGA
IC505 pin 25	SHAPNESS	L : SOFT H : SHARP
IC505 pin 26 IC505 pin 27	PAPER 1 PAPER 2	L, L } TYPE1 H, L } TYPE2 L, H } TYPE3
IC505 pin 28	POST FEED	L : ON H : OFF

Rear DIP SW	Function	Operation
IC505 pin 39	INPUT	L : B&W H : COLOR
IC505 pin 40 IC505 pin 41	SCAN	L, L } WIDE1 ; H, L } NORMAL ; L, H } WIDE2
IC505 pin 42	DIRECTION	L : NORMAL H : REVERSE
IC505 pin 43	MEMORY	L : FRAME H : FIELD
IC505 pin 45	ASPECT	L : 4 : 3 H : 1 : 1
IC505 pin 46	INTERRUPT	L : ON H : OFF
IC505 pin 4	MIRROR	L : ON H : OFF
IC505 pin 5	RESERVED	

4-4-3. Platen Motor Control

IC505 pins 93, 94, 95 and 96 control correct rotation or reverse rotation and rotation speed of platen motor by operating driving transistors Q405, 406, 407 and 408.

PM_A1 (IC505-93pin)	L	L	H	H
PM_A2 (IC505-94pin)	H	H	L	L
PM_B1 (IC505-95pin)	L	H	H	L
PM_B2 (IC505-96pin)	H	L	L	H
	correct rotation ◄——► reverse rotation			

4-4-4. Head Up and Down Control

Up and down motor of the head is driven by IC402. Correct rotation and reverse rotation are possible. And their controls are performed by IC505 pins 97 and 98. The head position is detected by optical type head position sensors (SE-441 board, PH201 and 202) and read by IC505 pins 79 and 80.

Operation of Head Up and Down Motor

Head motor	IC505-98pin	IC505-97pin	Operation
UP	L	H	Head is lifted.
DOWN	H	L	Head is down.
STOP	H	H	Stopped

Condition of Head Position Sensor

Head position sensor	IC505-80pin	IC505-79pin	Condition
TOP	L	L	Door lock is released.
HOME	L	H	Wait (Usual)
BOTTOM	H	L	Print

4-4-5. Door Open and Close Control

Open and close motor of the door is driven by IC403. Correct rotation and reverse rotation are possible. And their controls are performed by IC505 pins 99 and 100. Door position is detected by optical type door position sensors (SE-442 board PH401, 402) and read by IC505 pins 84 and 85.

Operation of Door Open and Close

Door motor	IC505-100pin	IC505-99pin	Operation
NEUTRAL	L	L	Neutral
CLOSE	L	H	Door is shut.
OPEN	H	L	Door is opened.
STOP	H	H	Stopped

Condition of Door Position Sensor

Door position sensor	IC505-85pin	IC505-84pin	Condition
CLOSE	L	L	Door is shut.
OPEN	H	L	Door is opened.

In case the door is shut, to judge whether door is completely shut or not, door position sensor detects and door lock sensor circuit (MA-91 board IC404 peripheral circuit) that is driving current detection type also detects and read by IC505 pin 87.

Condition of Door Lock Sensor



Door lock sensor	IC505-87pin	Condition
CLOSE	H	Door is shut.
OPEN	L	Door is opened.

4-4-6. Watch of Paper Sensor

Whether the print paper is set in the unit correctly or not, it is detected by three pairs of optical type paper sensors (SE-485 board PH502, PTC-98 board PH301) and read by IC505 pins 81 and 83.

Condition of Paper Sensor (— : L or H)

IC505-83pin	IC505-81pin	Condition
L	L	There is a paper.
L	H	No paper
H	L	No paper
H	H	No paper

4-4-7. Watch of the Head Temperature Sensor

The resistor value change of thermistor included in the thermal head is converted to the voltage by IC404. The result is fetched to IC505 pin 78 and is converted A/D. Cause of this A/D converted digital value, the density (Gamma) adjustment, fan motor control for head cooling and head in cooling judge by IC601 (Gate array) are performed.

4-4-8. Head Fan Motor (for Head Cooling) Control

Head fan motor is operated by controlling the driving transistor Q409 using IC505 pin 2. When the head temperature is over heat or during print mode, head fan motor is turned ON.

Operation of Head Fan Motor

IC505-2pin	Operation
L	OFF
H	ON

4-4-9. Analog Circuit Section Control

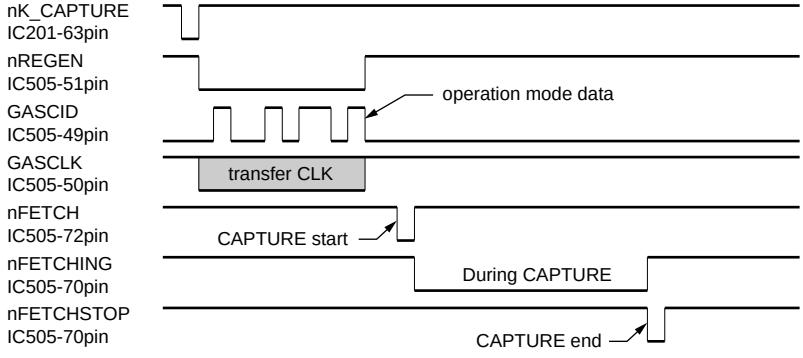
IC505 controls followings.

Pin No	I/O	Explanation	Process of IC505
IC505 pin 37	O	Selection of trap filter ON/OFF	L : ON H : OFF
IC505 pin 36	O	Selection of NTSC/PAL	L : When NTSC signal is inputted. H : When PAL signal is inputted.
IC505 pin 34	O	Selection of AGC function ON/OFF	L : ON H : OFF
IC505 pin 33	O	Selection of SHARPNESS ON/OFF	L : ON H : OFF
IC505 pin 31	I	Composite sync signal	Measure horizontal sync frequency and use it signal distinction.

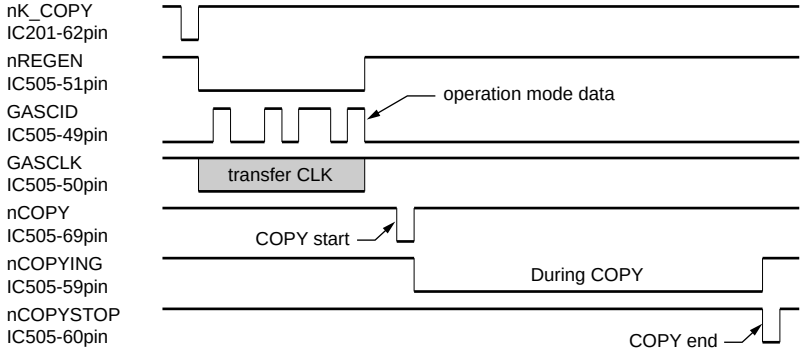
4-4-10. Gate Array IC601 Control

IC505 transfers operation mode data to gate array IC601. Start and end indication of CAPTURE (video signal fetch to the memory) operation and COPY (memorized image is sent to the head.) operation are performed.

[CAPTURE Mode]



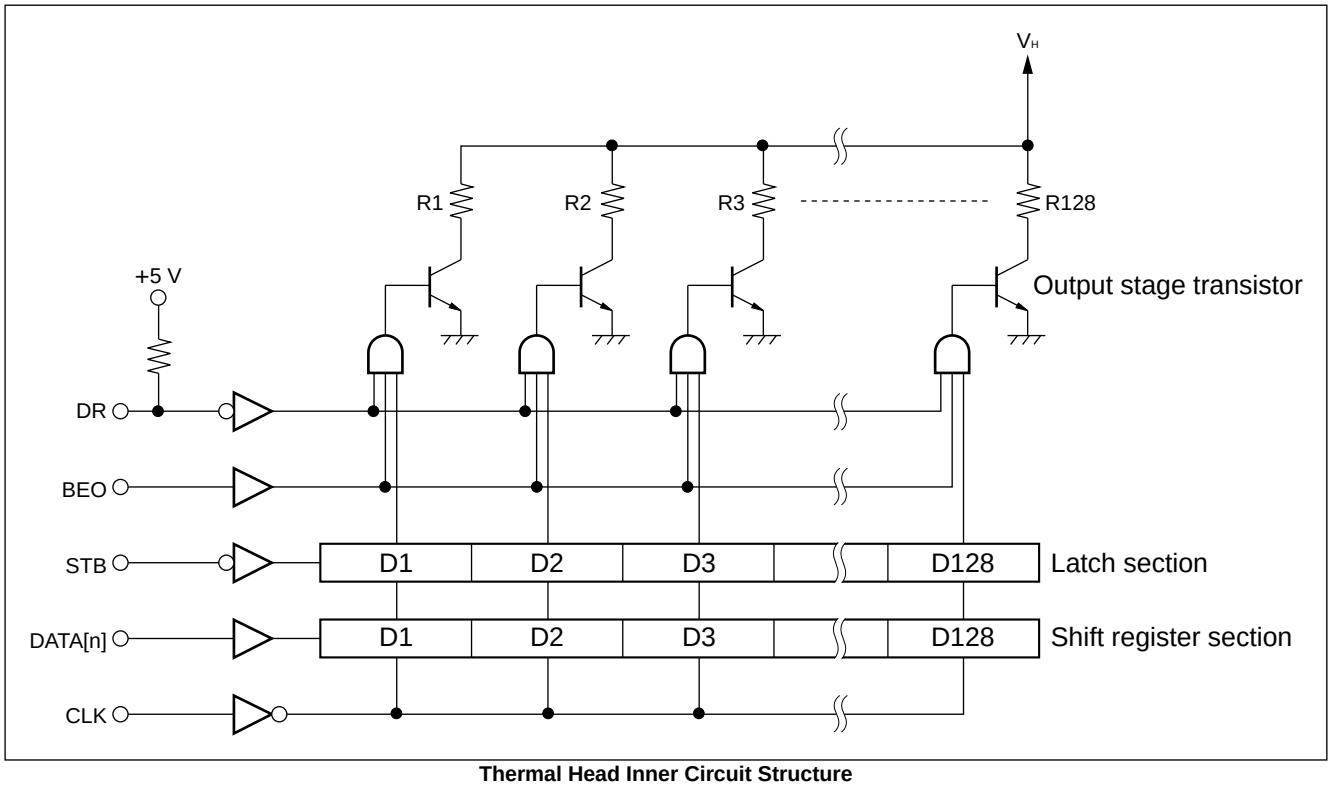
[COPY mode]



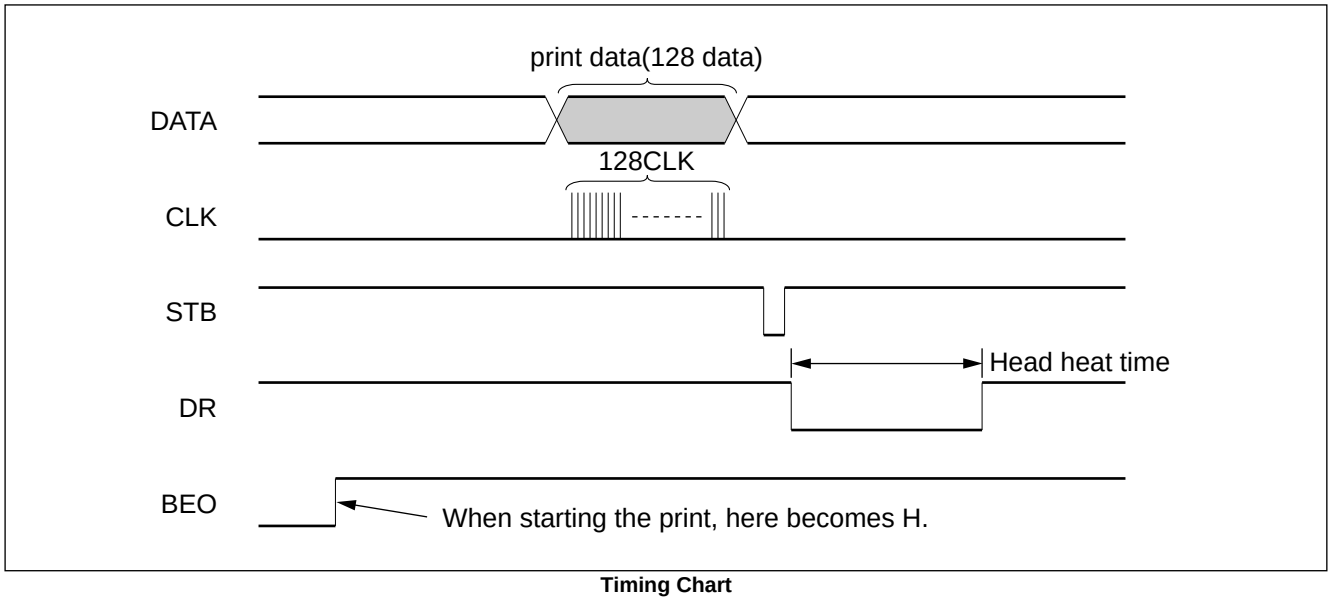
4-5. THERMAL HEAD SECTION

4-5-1. Structure

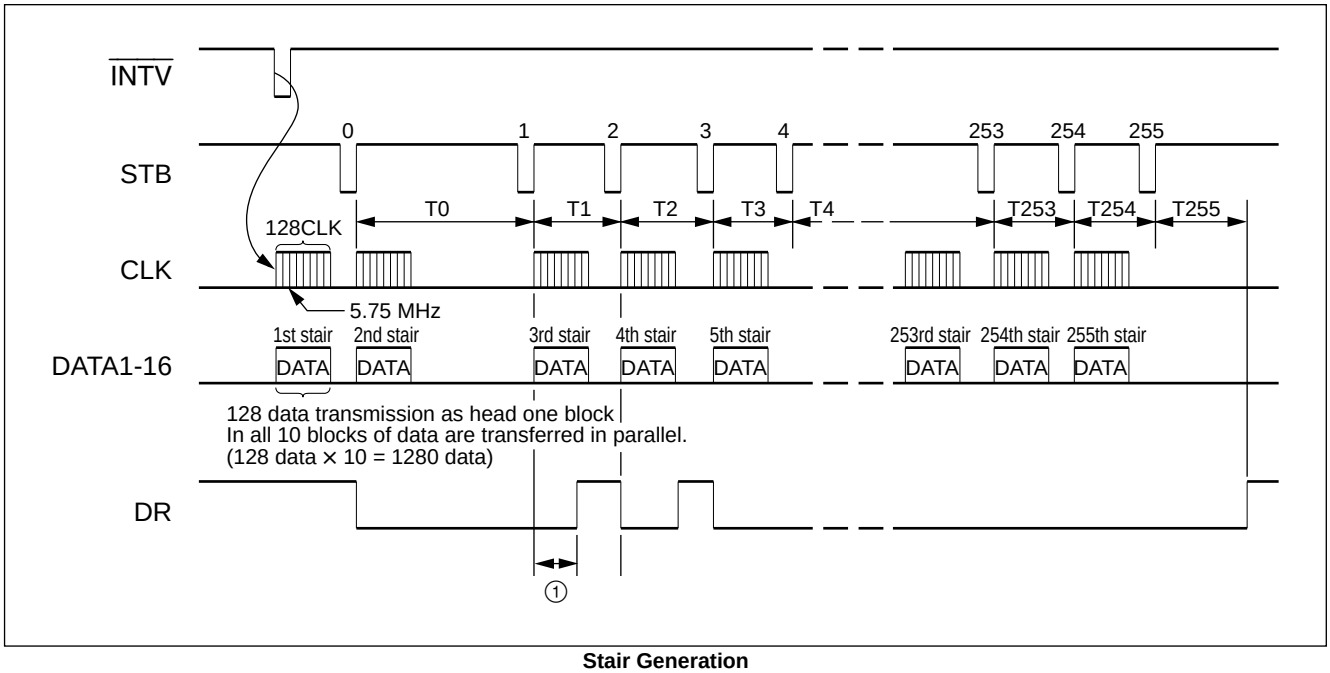
Thermal head consists of one line 1280 dot (128 bit × 10). There are ten combinations such as follows.
(DATA input is 10 DATA [10 : 1], other terminals are common.)



Thermal Head Inner Circuit Structure



Timing Chart



Stair Generation

4-5-2. Basic Operation

All the signals are inputted to the head from the gate array IC601. This section only explains the operations for one block. (The operations for the other blocks are the same.)

(1) The 128 data of print data are inputted to the shift register synchronized with CLK.
(2) When the STB pulse is inputted, the data inputted in (1) is moved from the shift register section to the latch section.
(3) When the DR pulse is inputted, the output stage transistors are switched ON/OFF by the "H" and "L" latch section data. While the transistor is turned ON, the resistors heat up and thermosensitive paper changes color. The amount of heat generated is controlled by varying the length of the DR pulses, so the color darkness of the printing on thermosensitive paper can be varied.

Note : The BEO terminal goes from "L" to "H" when starting the print, from "H" to "L" when print is ended.

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4-5-3. Stair Generation

As explained in the last section on basic operation, the darkness of the printing can be controlled with the DR pulses, but it is possible to change the darkness by changing the “H” and “L” data input to the latch section.
The method is explained as follows.

(1) One line image data recorded in image memory IC602 and 603 is fetched to line memory inside of IC601 every print operation one line (nINTV) by controlling IC601.
(2) Fetched data in line memory is inputted to the stair generation circuit inside of IC601. The stair data generation circuit outputs fetched 8 bit data in line memory as 1 through 256 stair data. If 8 bit data is 128, 1 through 128 stair of data 1 through 16 outputs “H” against the head, 129 stair or more outputs the data “L”.
(3) Output data from data generation circuit to the head is transferred to the shift register section of the head with synchronized CLK outputted from IC601.
(4) When IC601 inputs the “1” STB pulse to the head, the 1st stair data is transferred to the latch section and 2nd stair data is inputted to the shift register section. At the same time, the DR pulse goes to “L” and the “H” data among the data input as the first stair data switches on the corresponding output stage transistors, heating up the corresponding resistors. The “L” data switches OFF the corresponding output stage transistors so those resistors do not heat up. This operation is carried out 256 times. If “H” data is sent the 1 through 256 times, the resistors generate heat the entire time and the printing is the blackest possible. If the “H” data is only high until the 1 through 128 times, the printing is an intermediate stair. This is how intermediate stairs are generated by sending number of data corresponding 8 bit data size to the head and generating heat in the resistors that many times.
(5) Thus, by controlling the time until the next data is transferred to the latch, the darkness of intermediate stairs can be achieved simply. In other words, intermediate stair darkness can be controlled by changing the STB intervals, T1, T2, T3, T4, T5, T6 — T256. In this unit, IC601 matches the intervals T1 to T256 to the paper’s gamma characteristic. This is called gamma characteristic control.
(6) If the DR pulse is also controlled as described in 4-5-2. Basic Operation, even fine stair can be expressed.

Note : The portion ① is generated when the STB pulse T interval is shorter than the transmission time to shift resistor.

Thus, this unit provides smooth expression of intermediate stairs by controlling the STB pulse T interval and the DR pulse.

4-5-4. Temperature Compensation

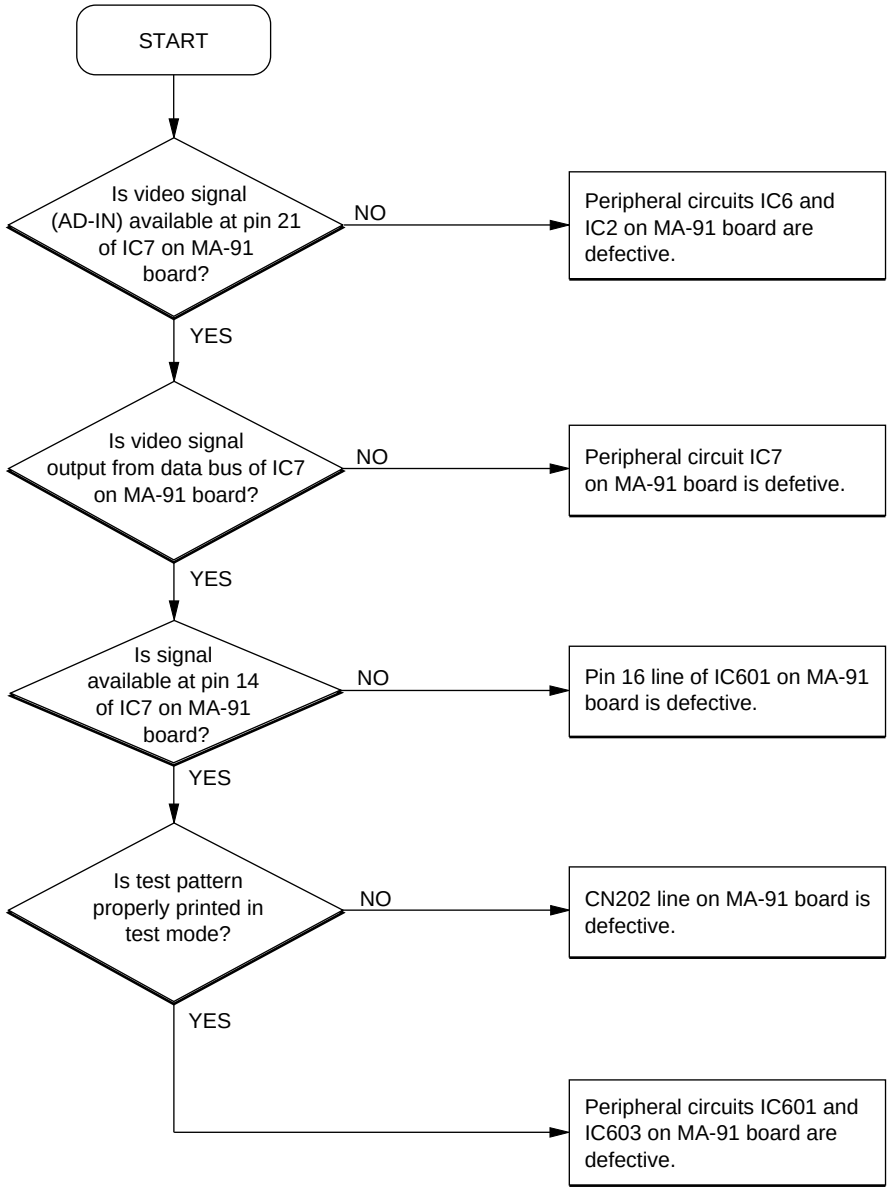
As explained in 4-5-3. Stair Generation, intermediate stair are expressed by controlling the STB pulse T interval and the DR pulses, but since the energy required to make thermosensitive paper turn color varies with the room temperature and with the heat generated by and built up in the printing head during continuous printing. In this unit, IC505 measures the temperature change of the head from the thermistor (CN202 pins 15 and 16) included in thermal head and converts head temperature data of 8 bit. IC505 corrects density change against the temperature by reflecting gamma characteristic control of IC601. IC601 performs to compensate for temperature change controls the STB pulse T interval and the DR pulse, just as is done for stair generation. Specifically, when the temperature rises it reduces the STB pulse T interval and the DR pulses, but when the temperature falls, it increases the STB pulse T interval and the DR pulses.

4-5-5. Line Number Correction

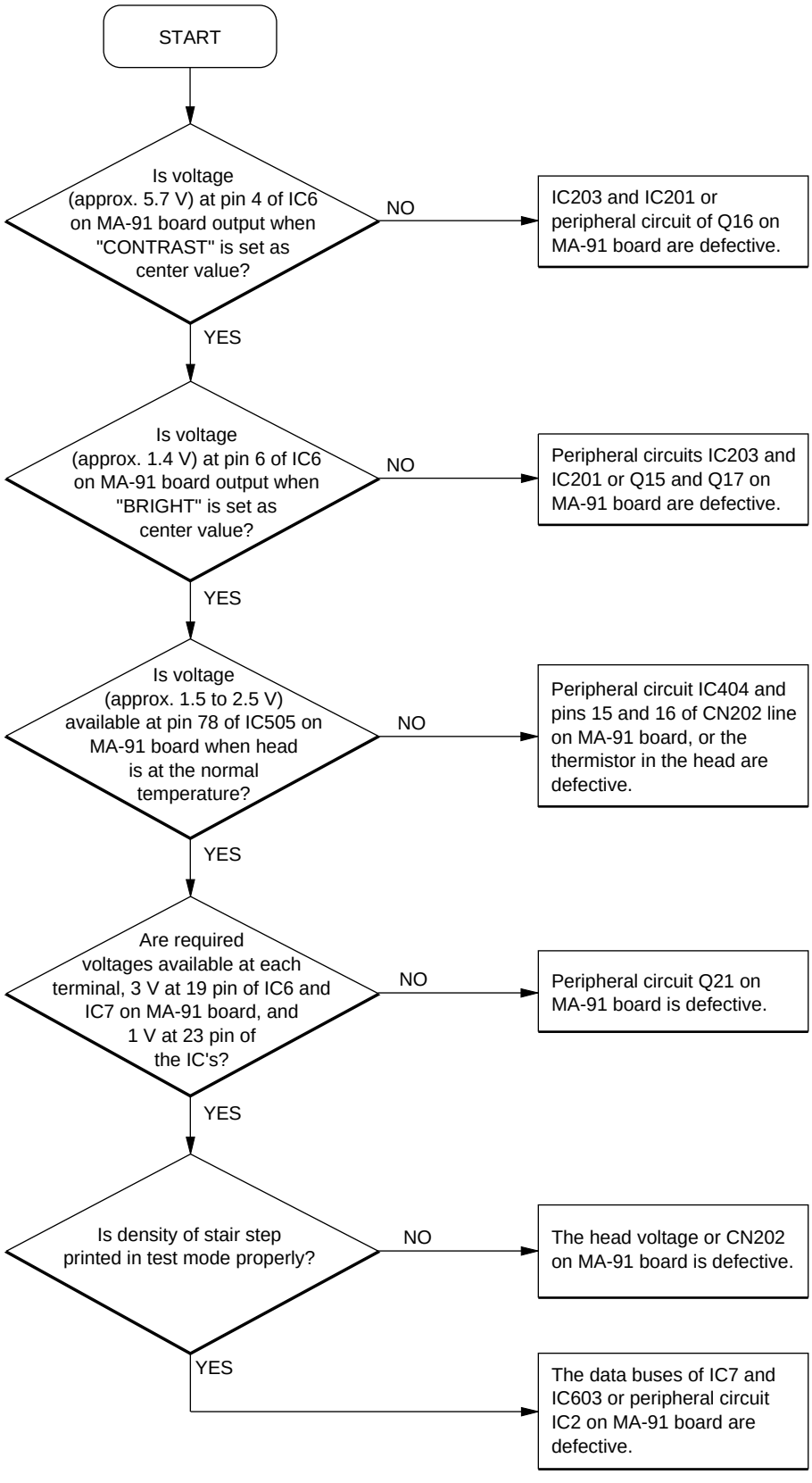
When all resistors of the head are switched ON or when some resistors of the head are switched ON, total currents through the head are different. Therefore, the energy applied to each resistor has an error. If printing operation is performed without this correction, as a result, there is a line on the print where numbers of ON resistor are rapidly changed.
And this unit has IC601 that includes correction circuit of this.

SECTION 5
TROUBLESHOOTING

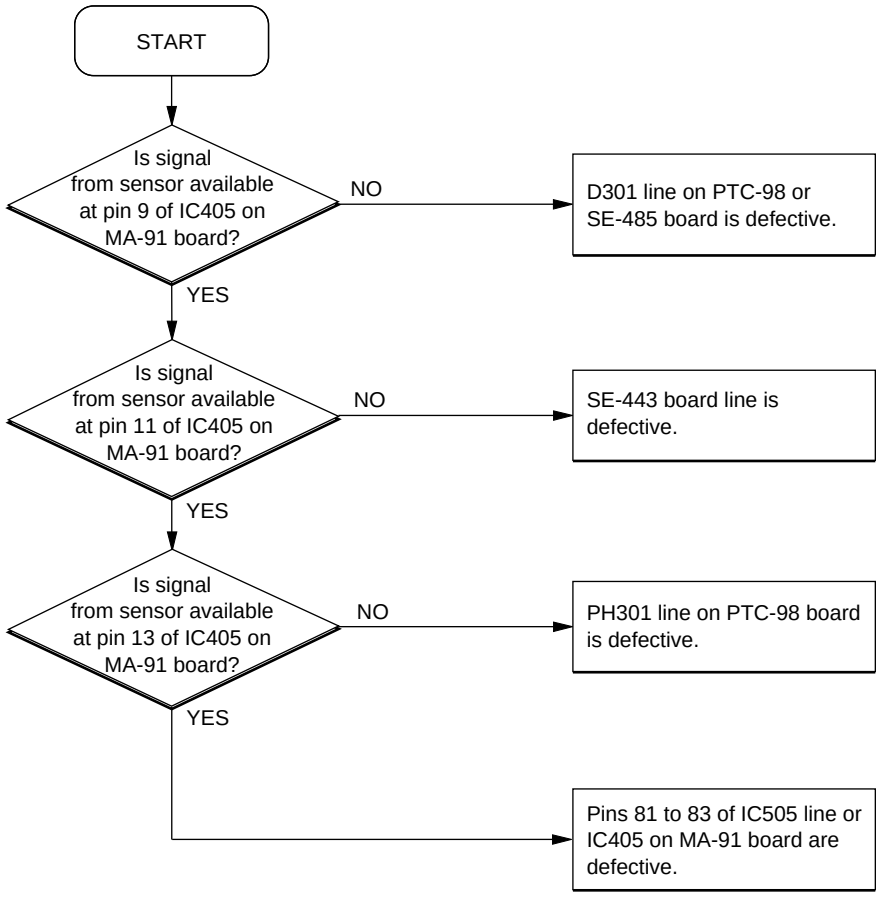
5-1. PRINT IS FAULTY



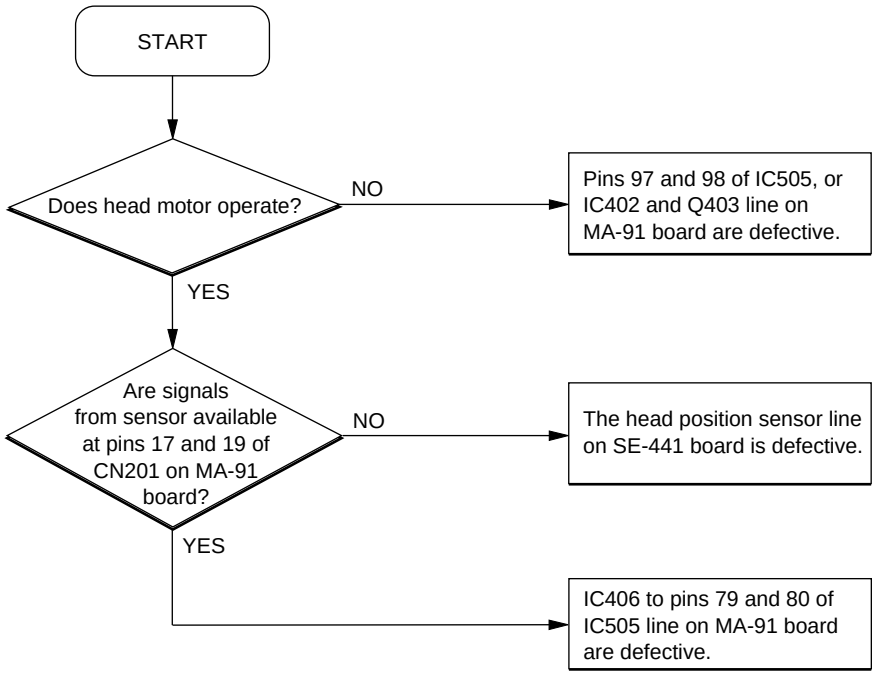
5-2. PRINT IS TOO DARK OR TOO LIGHT



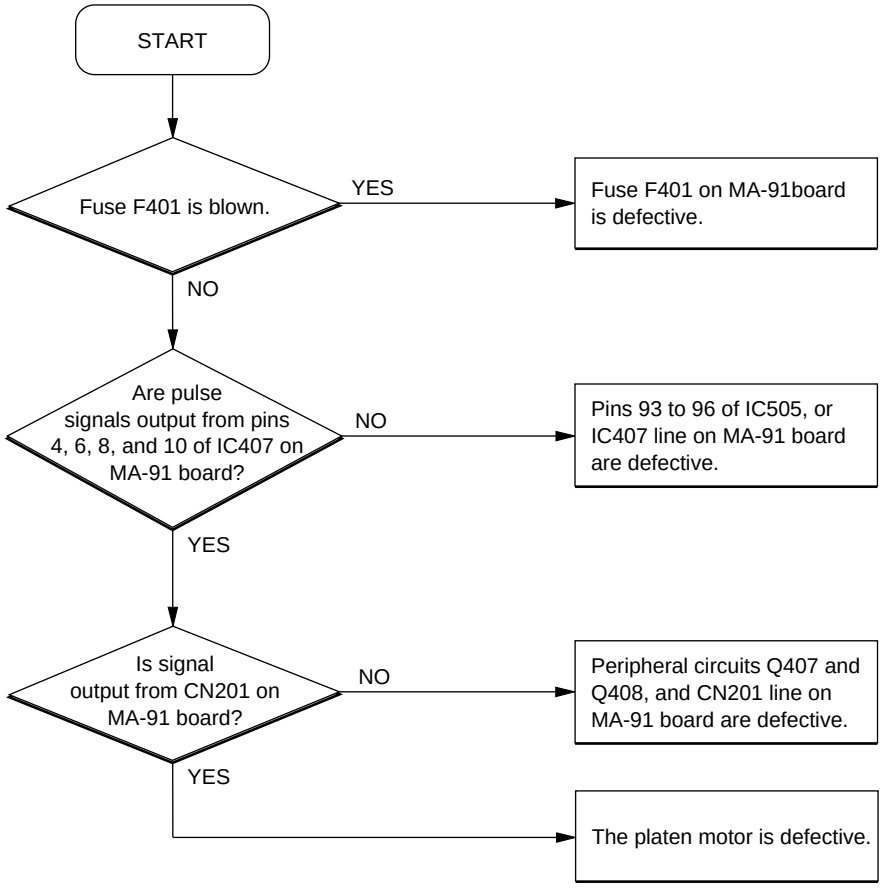
5-3. “PAPER SENSOR” IS OUT OF ORDER



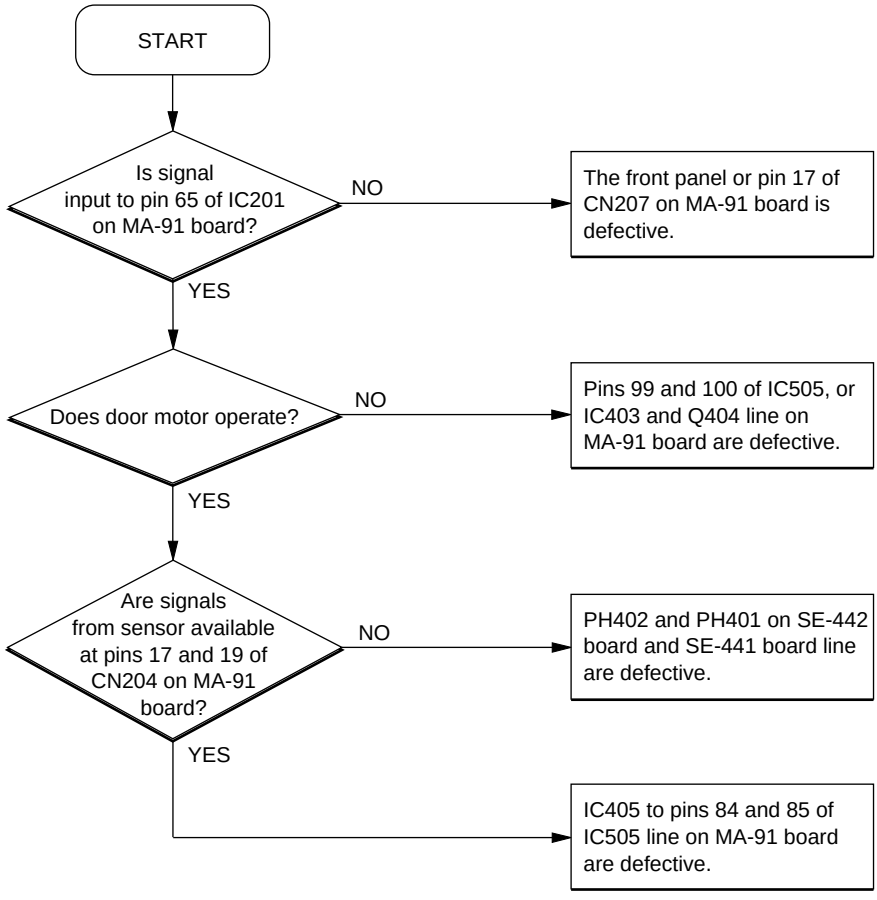
5-4. HEAD OPERATION (UP & DOWN) IS OUT OF ORDER



5-5. PAPER FEEDING IS OUT OF ORDER



5-6. DOOR (OPENING & CLOSING) IS OUT OF ORDER



SECTION 6
SEMICONDUCTOR PIN ASSIGNMENTS

Semiconductors of which functions are equivalent are described here. For parts replacement, refer to the section of Spare Parts in this manual. The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

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1SS302-TE85L 6-2
10E-2 6-2

LED **Page**

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TRANSISTOR **Page**

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2SA1162G 6-2
2SC1623 6-2
2SC1623-T1-L5L6 6-2
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2SD992-Z-E2 6-2
2SD999-CLCK 6-2
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XN4402-(TX) 6-2
XN4501 6-2
XN4501-TW 6-2
XN4601 6-2
XN4601-TW 6-2

OTHERS **Page**

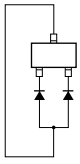
RPI-352 6-2

IC **Page**

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CXD8726R 6-3
CXD8932Q 6-3
HA11465A 6-4
HD14053BFP 6-4
HD6473042F12 6-4
LM358PS 6-5
LM358PS-E20 6-5
LM1201MX 6-5
M54543L 6-5
MB40C568HPF-ER 6-5
MC14053BF-T2 6-4
NJM2234M 6-5
NJM2234M(T1) 6-5
NJM7812FA 6-6
PST600DMT-T1 6-6
SN74HC14ANS 6-6
SN74HC14ANS-E05 6-6
TA7812S 6-6
TMS418160A-60DZ 6-6

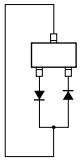
DIODE

—TOP VIEW—

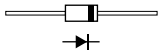


1S2836
1S2836-T1

—TOP VIEW—

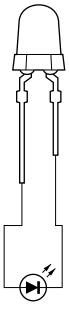


1SS302
1SS302-TE85L



10E-2

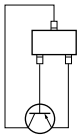
LED



TLN225

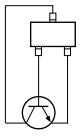
TRANSISTOR

—TOP VIEW—

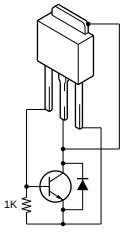


2SA812-T1-M5M6
2SA1162G

—TOP VIEW—

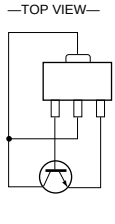


2SC1623
2SC1623-T1-L5L6



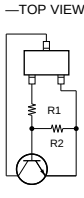
2SD992-Z
2SD992-Z-E2

—TOP VIEW—

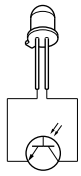


2SD999-CLCK
2SD999-T1-CLCK

—TOP VIEW—

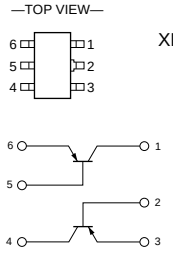


DTC124EKA-T146
(R1, R2=22 K)



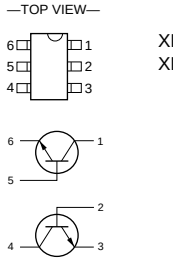
PT501A

—TOP VIEW—



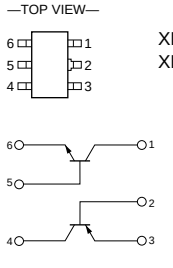
XN4402-(TX)

—TOP VIEW—



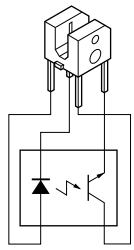
XN4501
XN4501-TW

—TOP VIEW—



XN4601
XN4601-TW

OTHERS



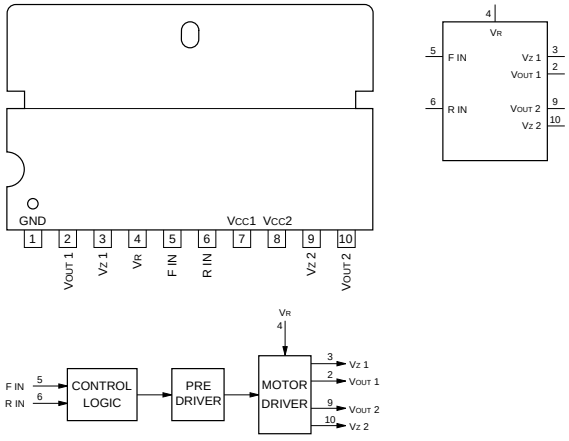
RPI-352

http://getMANUAL.com

IC

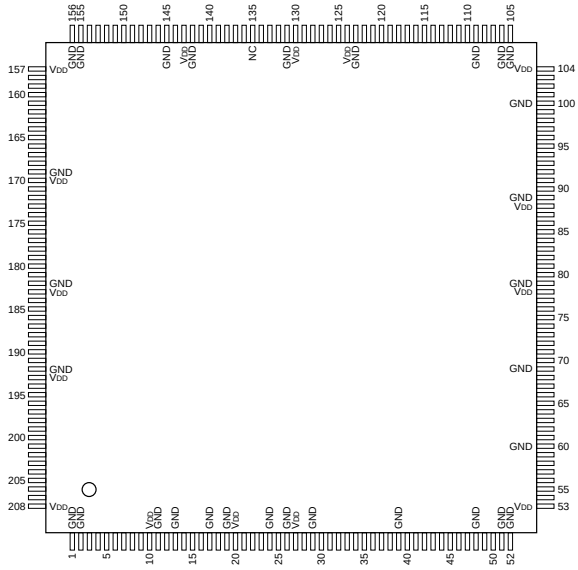
BA6219B (ROHM)

REVERSIBLE MOTOR DRIVER
—SIDE VIEW—



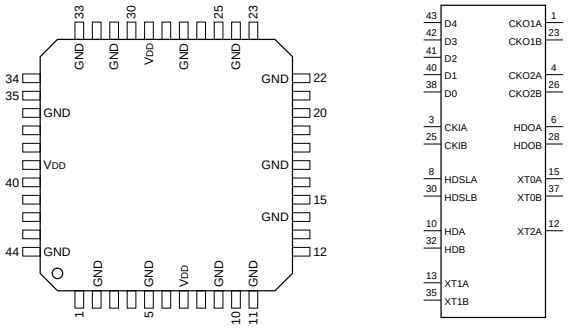
CXD8726R (SONY)

C-MOS FRAME MEMORY CONTROL
—TOP VIEW—



CXD8932Q (SONY)

C-MOS GATE ARRAY
—TOP VIEW—



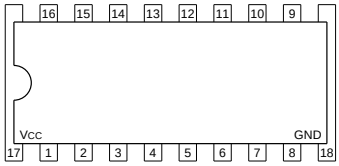
PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL
1	O	CKO1A	12	O	XT2A	23	O	CKO1B	34	—	NC
2	—	GND	13	I	XT1A	24	—	GND	35	I	XT1B
3	I	CKIA	14	—	GND	25	I	CKIB	36	—	GND
4	O	CKO2A	15	O	XT0A	26	O	CKO2B	37	O	XT0B
5	—	GND	16	—	NC	27	—	GND	38	I	D0
6	O	HDOA	17	—	GND	28	O	HDOB	39	—	VDD
7	—	VDD	18	—	NC	29	—	VDD	40	I	D1
8	I	HDSLA	19	—	NC	30	I	HDSLB	41	I	D2
9	—	GND	20	—	NC	31	—	GND	42	I	D3
10	I	HDA	21	—	NC	32	I	HDB	43	I	D4
11	—	GND	22	—	GND	33	—	GND	44	—	GND

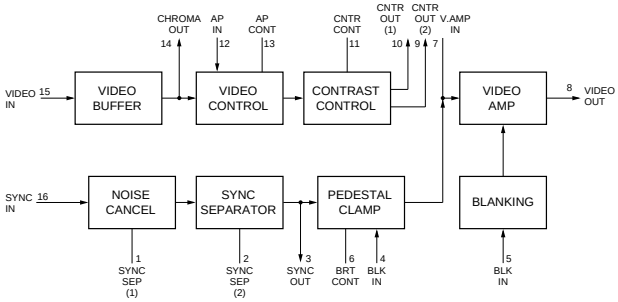
PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL	PIN NO.	I/O	SIGNAL
1	—	GND	53	—	VDD	105	—	GND	157	—	VDD
2	—	GND	54	I/O	DIOA2	106	—	GND	158	I	TEST9
3	I	C SYNCB	55	I/O	DIOA3	107	O	WE0B	159	I	TEST10
4	O	EXTHB	56	I/O	DIOA4	108	O	WE1B	160	I	TEST11
5	O	EXTVB	57	I/O	DIOA5	109	—	GND	161	I	TEST12
6	O	CLUMPB	58	I/O	DIOA6	110	O	HCLK	162	I	TEST13
7	I	CL SEL0	59	I/O	DIOA7	111	O	DRB	163	I	TEST14
8	I	CL SEL1	60	—	GND	112	O	STBB	164	I	TEST15
9	I	HDO0	61	I/O	DIOA8	113	O	HDATA9	165	I	TEST16
10	—	VDD	62	I/O	DIOA9	114	O	HDATA8	166	I	TEST17
11	—	GND	63	I/O	DIOA10	115	O	HDATA7	167	I	TEST18
12	I	DCKI0	64	I/O	DIOA11	116	O	HDATA6	168	I	TEST19
13	—	GND	65	I/O	DIOA12	117	O	HDATA5	169	—	GND
14	I	DCKI1	66	I/O	DIOA13	118	O	HDATA4	170	—	VDD
15	—	GND	67	I/O	DIOA14	119	O	HDATA3	171	O	BLKB TST
16	O	DCKO0	68	I/O	DIOA15	120	O	HDATA2	172	O	DO TST0
17	—	GND	69	—	GND	121	O	HDATA1	173	O	DO TST1
18	O	DCKO1	70	I/O	DIOB0	122	O	HDATA0	174	O	DO TST2
19	—	GND	71	I/O	DIOB1	123	—	GND	175	O	DO TST3
20	—	VDD	72	I/O	DIOB2	124	—	VDD	176	O	DO TST4
21	I	H SYNCB	73	I/O	DIOB3	125	I	FETCHB	177	O	DO TST5
22	I	HDO1	74	I/O	DIOB4	126	I	FTSTOPB	178	O	DO TST6
23	I	MCLK	75	I/O	DIOB5	127	O	FECHINGB	179	O	DO TST7
24	—	GND	76	I/O	DIOB6	128	I	COPYB	180	O	P1B TST
25	O	SCLK	77	I/O	DIOB7	129	I	CPSTOPB	181	O	P2B TST
26	—	GND	78	—	VDD	130	—	VDD	182	—	GND
27	—	VDD	79	—	GND	131	—	GND	183	—	VDD
28	O	HTO	80	I/O	DIOB8	132	O	COPYINGB	184	O	P3B TST
29	—	GND	81	I/O	DIOB9	133	O	INT VB	185	O	PRTB TST
30	I	DCKSEL	82	I/O	DIOB10	134	I	MTPULSE	186	O	WSAD TST
31	I	AD07	83	I/O	DIOB11	135	—	NC	187	O	WSB TST
32	I	AD06	84	I/O	DIOB12	136	I	REGSEL0	188	O	OD TSO14
33	I	AD05	85	I/O	DIOB13	137	I	REGSEL1	189	O	HS TSO15
34	I	AD04	86	I/O	DIOB14	138	I	REGLDB	190	I	TEB
35	I	AD03	87	I/O	DIOB15	139	I	REGENB	191	I	TIN
36	I	AD02	88	—	VDD	140	I	SCK	192	—	GND
37	I	AD01	89	—	GND	141	I	SI	193	—	VDD
38	I	AD00	90	O	DADR0	142	—	GND	194	O	GM TOUT
39	—	GND	91	O	DADR1	143	—	VDD	195	O	VC TOUT
40	I	AD17	92	O	DADR2	144	I	RESB	196	O	IP TOUT
41	I	AD16	93	O	DADR3	145	—	GND	197	O	HD TOUT0
42	I	AD15	94	O	DADR4	146	I	TEST0	198	O	HD TOUT1
43	I	AD14	95	O	DADR5	147	I	TEST1	199	O	HD TOUT2
44	I	AD13	96	O	DADR6	148	I	TEST2	200	O	HD TOUT3
45	I	AD12	97	O	DADR7	149	I	TEST3	201	O	HD TOUT4
46	I	AD11	98	O	DADR8	150	I	TEST4	202	O	HD TOUT5
47	I	AD10	99	O	DADR9	151	I	TEST5	203	O	HD TOUT6
48	—	GND	100	—	GND	152	I	TEST6	204	O	HD TOUT7
49	I/O	DIOA0	101	O	RASB	153	I	TEST7	205	O	HD TOUT8
50	I/O	DIOA1	102	O	CASB	154	I	TEST8	206	O	HD TOUT9
51	—	GND	103	O	OEB	155	—	GND	207	O	VF
52	—	GND	104	—	VDD	156	—	GND	208	—	VDD

HA11465A (HITACHI)

NTSC COLOR TV VIDEO AMPLIFIER

—TOP VIEW—



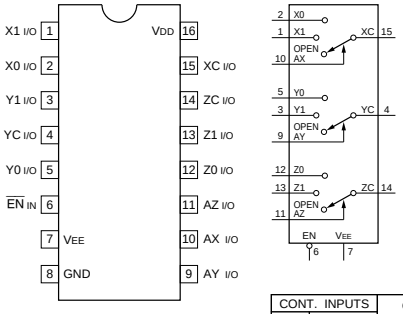


AP : APERTURE
BLK : BLANKING
BRT : BRIGHTNESS
CNTR : CONTRAST
CONT : CONTROL
SYNC SEP : SYNCHRONIZATION PULSE SEPARATION
V.AMP : VIDEO AMPLIFIER

HD14053BFP (HITACHI)FLAT PACKAGE
MC14053BF-T2

C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXERS/DEMULTIPLEXERS

—TOP VIEW—



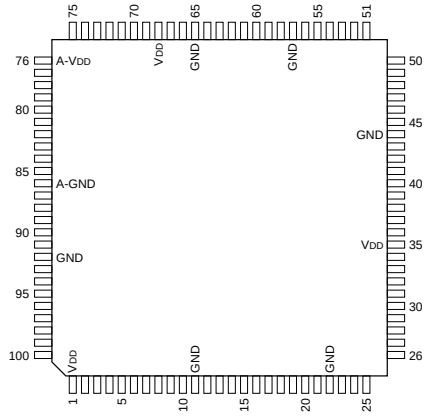
CONT. INPUTS		ON CHANNEL
EN	A (X, Y, Z)	
0	0	0
0	1	1
1	×	OPEN

0 : LOW LEVEL
1 : HIGH LEVEL
× : DON'T CARE

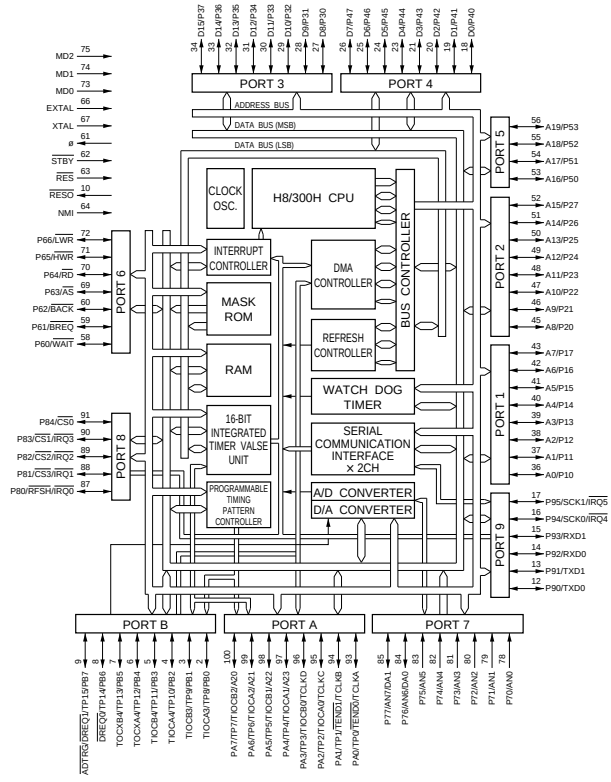
HD6473042F12 (HITACHI)

C-MOS 16-BIT MICRO PROCESSOR

—TOP VIEW—

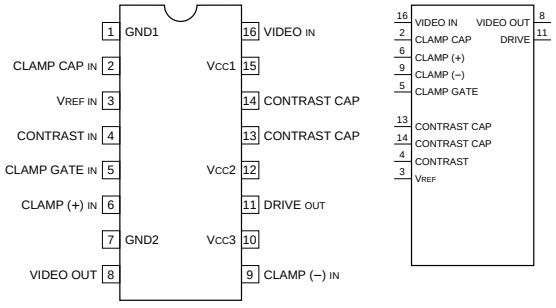


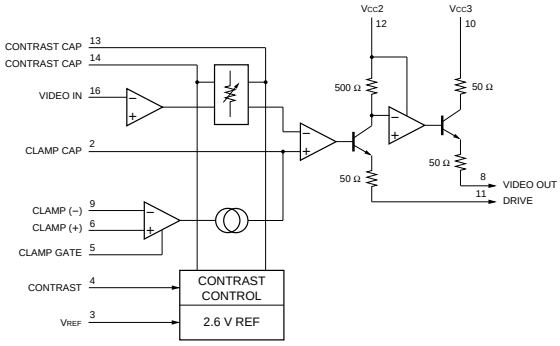
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2	I/O	PB0/TIOCA3/TP8	27	I/O	P30/D8	52	I/O	P27/A15	77	I	VREF
3	I/O	PB1/TIOCB3/TP9	28	I/O	P31/D9	56	I/O	P50/A16	78	I	P70/AN0
4	I/O	PB2/TIOCA4/TP10	29	I/O	P32/D10	54	I/O	P51/A17	79	I	P71/AN1
5	I/O	PB3/TIOCB4/TP11	30	I/O	P33/D11	55	I/O	P52/A18	80	I	P72/AN2
6	I/O	PB4/TOCXA4/TP12	31	I/O	P34/D12	56	I/O	P53/A19	81	I	P73/AN3
7	I/O	PB5/TOCXB4/TP13	32	I/O	P35/D13	57	—	GND	82	I	P74/AN4
8	I/O	PB6/DREQ0/TP14	33	I/O	P36/D14	58	I/O	P60/WAIT	83	I	P75/AN5
9	I/O	PB7/ADTRG/DREQ1/TP15	34	I/O	P37/D15	59	I/O	P61/BREQ	84	I/O	P76/AN6/DA0
10	O	RESO	35	—	VDD	60	I/O	P62/BACK	85	I/O	P77/AN7/DA1
11	—	GND	36	I/O	P10/A0	61	O	ø	86	—	A-GND
12	I/O	P90/TXD0	37	I/O	P11/A1	62	I	STBY	87	I/O	P80/RFSH/IRQ0
13	I/O	P91/TXD1	38	I/O	P12/A2	63	I	RES	88	I/O	P81/CS3/RAS/IRQ1
14	I/O	P92/RXD0	39	I/O	P13/A3	64	I	NMI	89	I/O	P82/CS2/IRQ2
15	I/O	P93RXD1	40	I/O	P14/A4	65	—	GND	90	I/O	P83/CS1/IRQ3
16	I/O	P94/IRQ4/SCK0	41	I/O	P15/A5	66	I	EXTAL	91	I/O	P84/CS0
17	I/O	P95/IRQ5/SCK1	42	I/O	P16/A6	67	I	XTAL	92	—	GND
18	I/O	P40/D0	43	I/O	P17/A7	68	—	VDD	93	I/O	PA0/TP0/TEND0/TCLKA
19	I/O	P41/D1	44	—	GND	69	I/O	P63/AS	94	I/O	PA1/TP1/TEND1/TCLKB
20	I/O	P42/D2	45	I/O	P20/A8	70	I/O	P64/RD	95	I/O	PA2/TP2/TIOCA0/TCLKC
21	I/O	P43/D3	46	I/O	P21/A9	71	I/O	P65/HWR	96	I/O	PA3/TP3/TIOCB0/TCLKD
22	—	GND	47	I/O	P22/A10	72	I/O	P66/LWR	97	I/O	PA4/TP4/TIOCA1/A23
23	I/O	P44/D4	48	I/O	P23/A11	73	I	MD0	98	I/O	PA5/TP5/TIOCB1/A22
24	I/O	P45/D5	49	I/O	P24/A12	74	I	MD1	99	I/O	PA6/TP6/TIOCA2/A21
25	I/O	P46/D6	50	I/O	P25/A13	75	I	MD2	100	I/O	PA7/TP7/TIOCB2/A20



LM1201MX (NS)FLAT PACKAGE

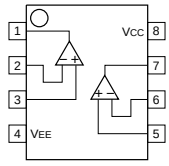
VIDEO AMPLIFIER
—TOP VIEW—





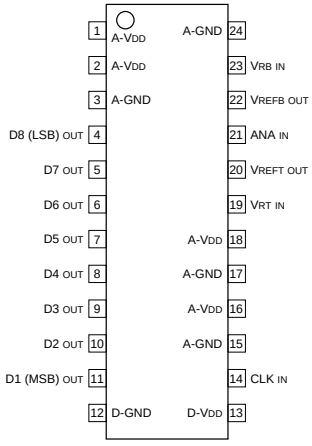
LM358PS (TI) FLAT PACKAGE
LM358PS-E20

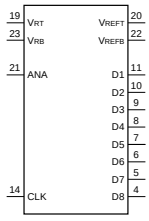
DUAL OPERATIONAL AMPLIFIERS
(SINGLE-SUPPLY TYPE)
—TOP VIEW—



MB40C568HPF-ER (FUJITSU)

C-MOS IMAGE PROCESSING A/D CONVERTER
—TOP VIEW—



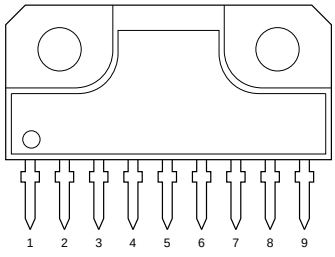


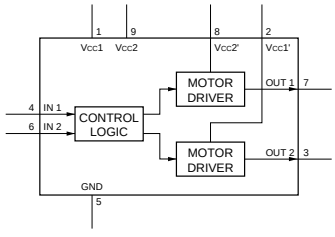
INPUT
ANA : ANALOG SIGNAL
CLK : CLOCK
VRB : REFERENCE VOLTAGE (+1 V)
VRT : REFERENCE VOLTAGE (+3 V)

OUTPUT
D1 - D8 : DIGITAL SIGNAL
VREFB : REFERENCE VOLTAGE (+1 V)
VREFT : REFERENCE VOLTAGE (+3 V)

M54543L (MITSUBISHI)

BI-DIRECTIONAL MOTOR DRIVER
—SIDE VIEW—



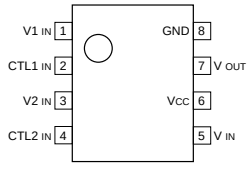


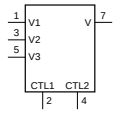
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

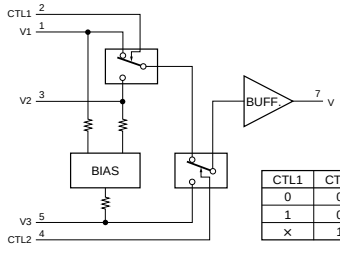
0 ; LOW LEVEL
1 ; HIGH LEVEL
Z ; HIGH IMPEDANCE

NJM2234M (JRC)FLAT PACKAGE
NJM2234M(T1)

3-INPUT VIDEO SIGNAL SWITCH
—TOP VIEW—





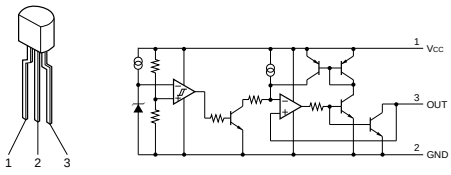


CTL1	CTL2	V
0	0	V1
1	0	V2
×	1	V3

0 : LOW LEVEL
1 : HIGH LEVEL
× : DON'T CARE

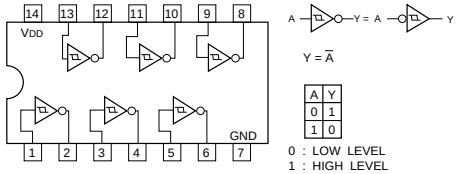
PST600DMT-T1 (MITSUMI)Vs=4.2 V

VOLTAGE DETECTOR



SN74HC14ANS (TI)FLAT PACKAGE
SN74HC14ANS-E05

C-MOS HEX SCHMITT TRIGGER INVERTERS
—TOP VIEW—

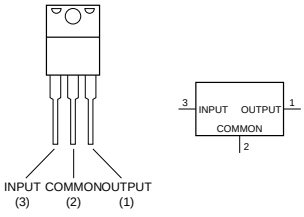


A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

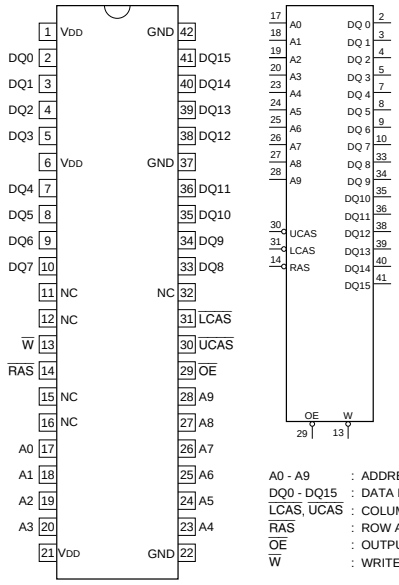
NJM7812FA
TA7812S (TOSHIBA) +12 V (1 A)

POSITIVE VOLTAGE REGULATOR
—FRONT VIEW—

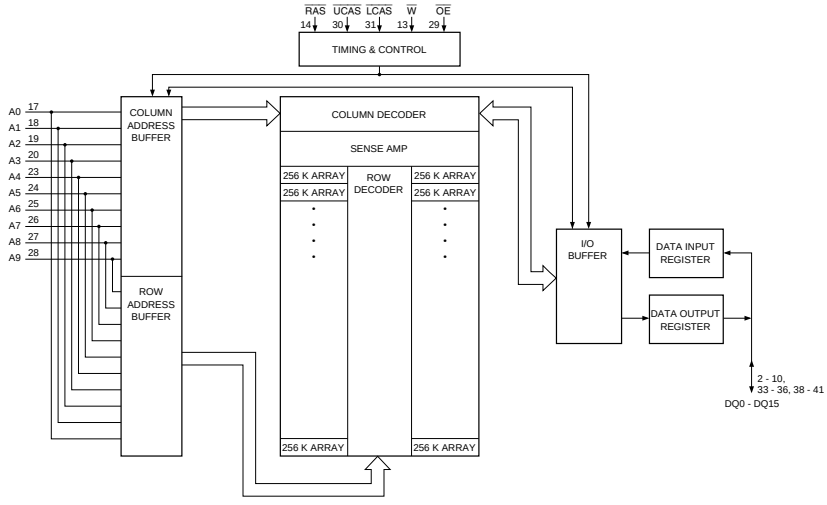


TMS418160A-60DZ (TI)

C-MOS 16 M (1,048,576 × 16)-BIT HIGH SPEED DRAM
—TOP VIEW—



A0 - A9	:	ADDRESS INPUTS
DQ0 - DQ15	:	DATA INPUTS/OUTPUTS
LCAS, UCAS	:	COLUMN ADDRESS CONTROL INPUTS
RAS	:	ROW ADDRESS CONTROL INPUT
OE	:	OUTPUT ENABLE INPUT
W	:	WRITE ENABLE INPUT



SECTION 7
SPARE PARTS

7-1. NOTES ON REPAIR PARTS

(1) Safety Related Components Warning

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

(2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to “accommodating the improved parts and/or engineering changes” or “standardization of genuine parts”.

This manual's exploded views and electrical spare parts list are indicating the part numbers of “the standardized genuine parts at present” .

(3) Stock of Parts

Parts marked with “o” SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with “o” will be processed, but allow for additional delivery time.

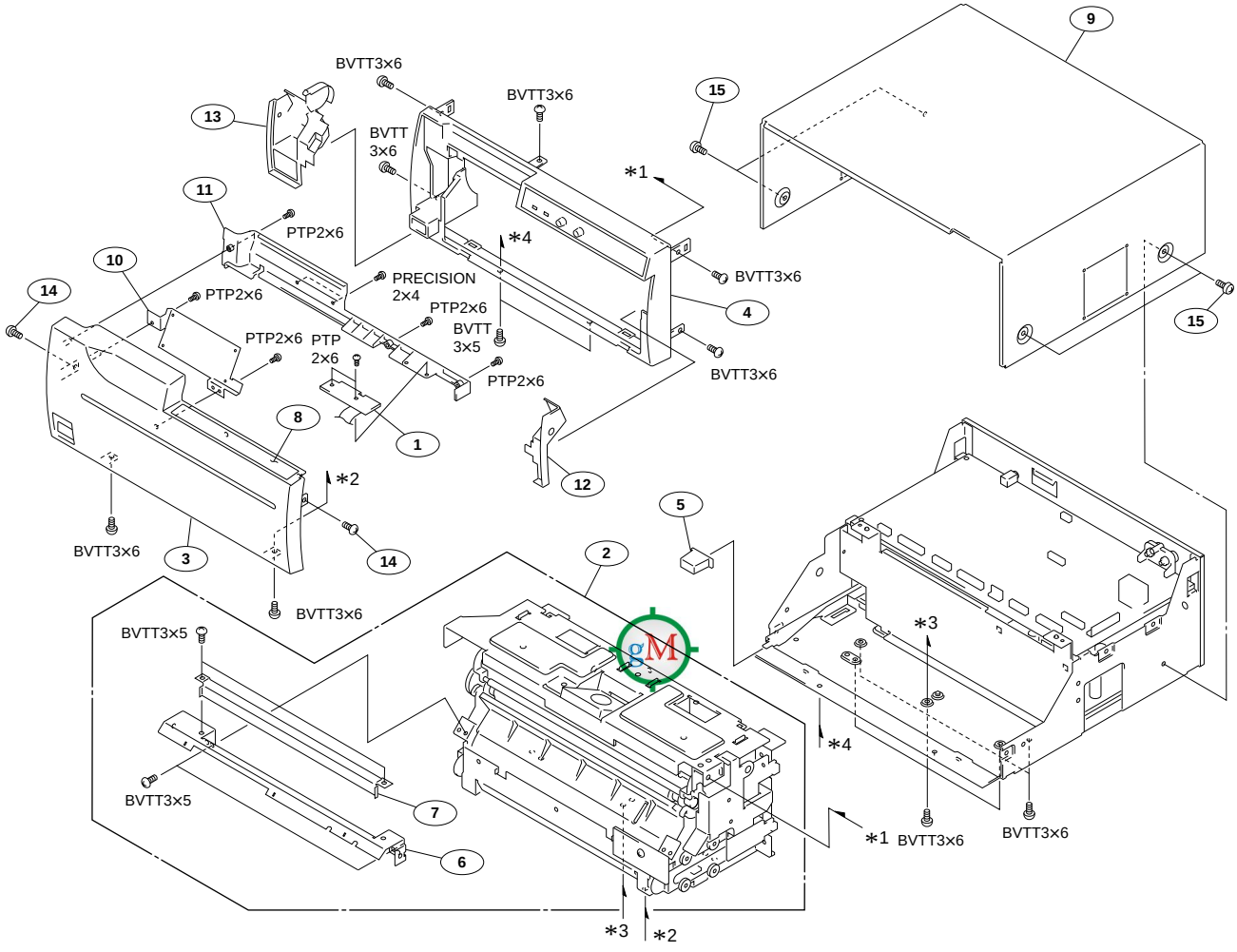
(4) Units for Capacitors, Inductors and Resistors

The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF
Inductors : μH
Resistors : Ω

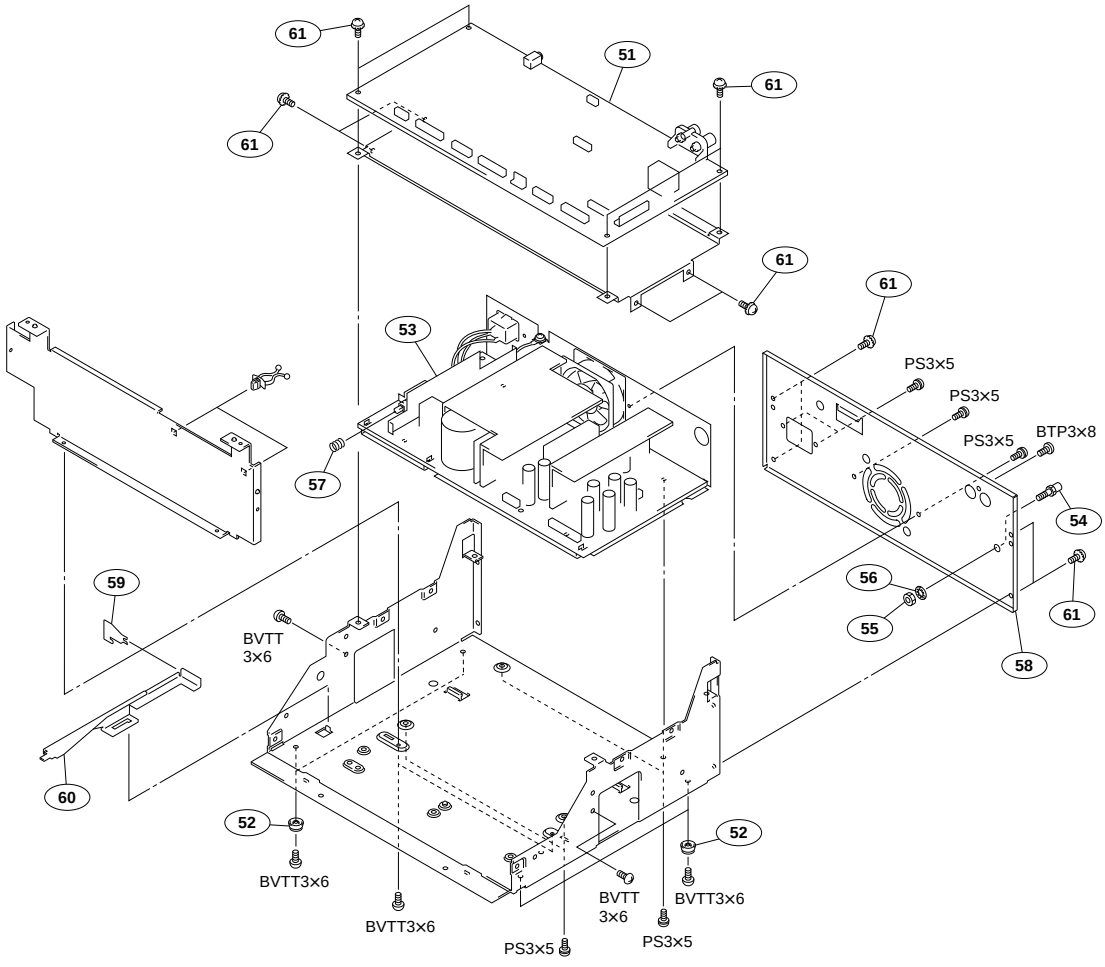
7-2. EXPLODED VIEW

Ornamental Block & Mechanical Block



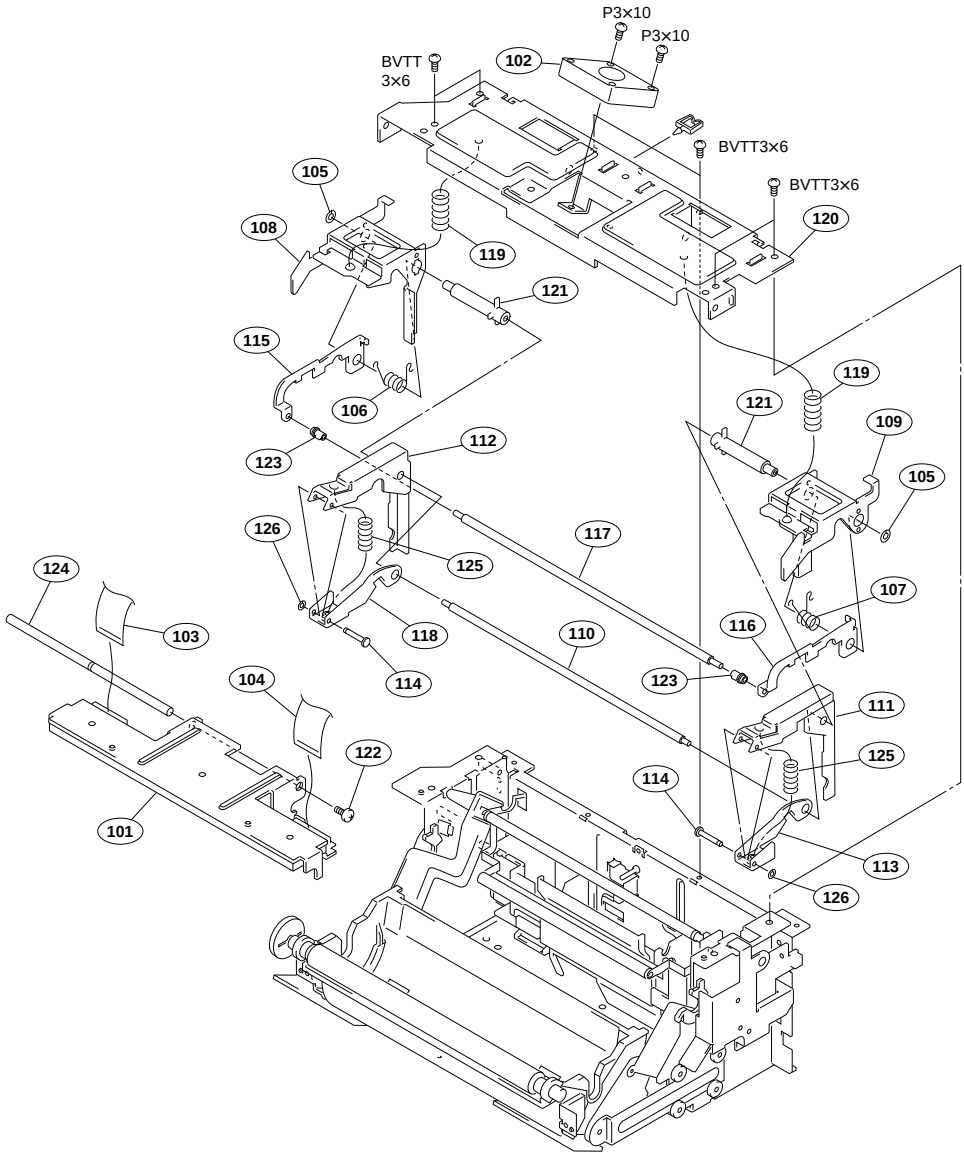
No.	Part No.	SP	Description
1	A-8318-883-A	o	MOUNTED CIRCUIT BOARD, KY-421
2	A-8318-887-A	o	ASSY, MECHA BLOCK
3	X-3604-901-1	s	ASSY, DOOR PANEL (for CE)
	X-3604-903-1	s	ASSY, DOOR PANEL (for J, UC)
4	1-475-784-11	s	PANEL UNIT, FRONT
5	2-431-568-51	o	BUTTON, POWER
6	3-613-736-01	o	GUIDE C, EJECT
7	3-613-739-01	o	GUIDE B, EJECT
8	3-613-776-02	o	SHEET, DOOR
9	3-613-791-01	o	COVER, TOP
10	3-613-819-01	o	SUPPORT, LCD
11	3-614-248-01	s	COVER, LCD
12	3-614-251-01	o	COVER, DOOR R
13	3-614-252-01	o	COVER, DOOR L
14	3-721-187-01	s	SCREW, BIND TP (S TIGHT) M3x8
15	4-886-821-11	s	SCREW, M3 CASE

Ornamental Block & Switching Regulator



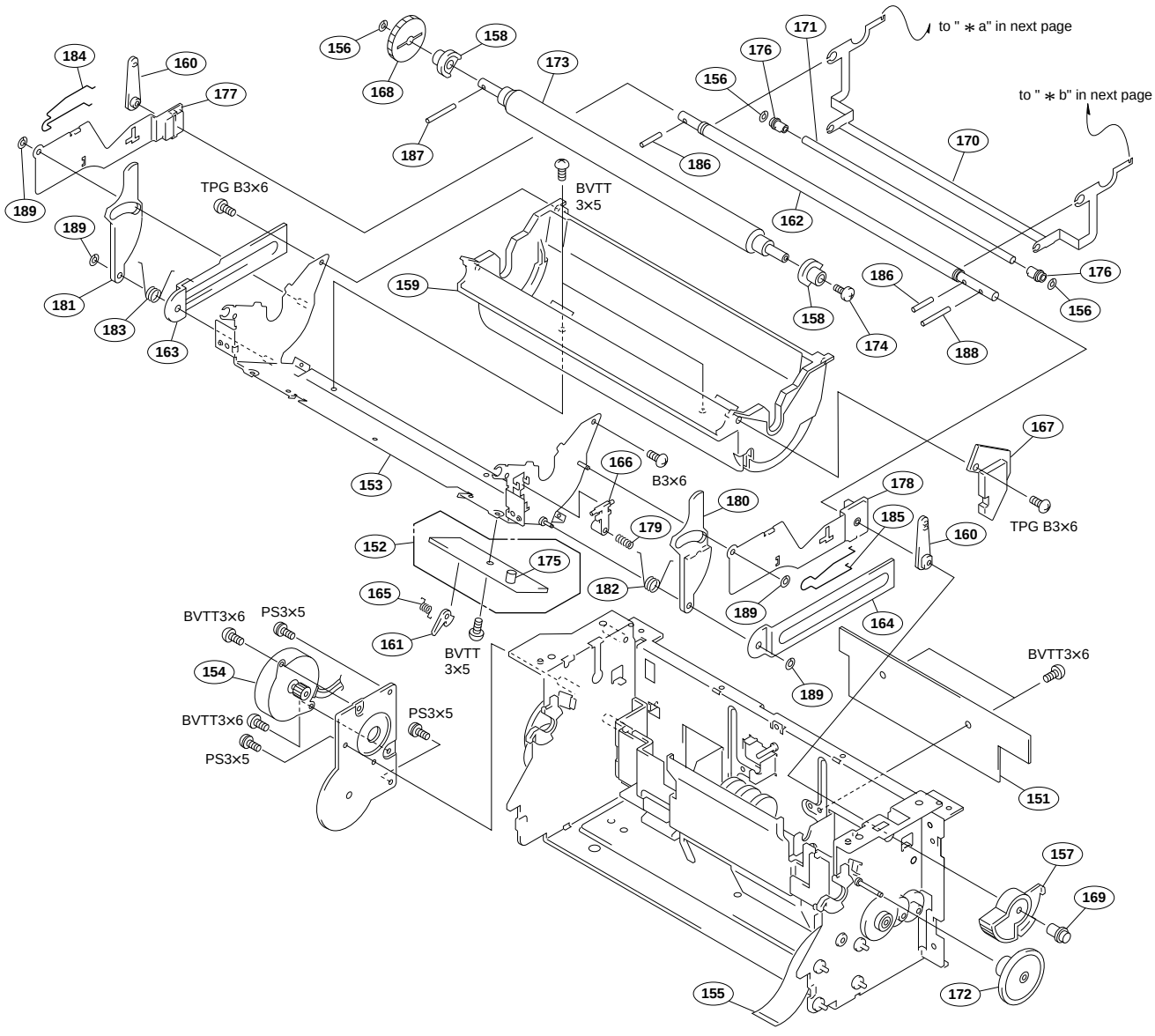
No.	Part No.	SP	Description
51	A-8318-877-A	o	MOUNTED CIRCUIT BOARD, MA-91
52	X-4875-123-1	s	FOOT ASSY, MF
53	⚠ 1-468-320-11	s	REGULATOR, SWITCHING
54	3-175-740-01	o	TERMINAL (for UC, CE)
55	3-175-741-01	o	NUT (for UC, CE)
56	3-175-742-01	o	WASHER (for UC, CE)
57	3-611-601-01	s	SPRING, COMPRESSION
58	3-613-792-12	o	PANEL, REAR (for UC, CE)
	3-613-792-32	o	PANEL, REAR (for J)
59	3-613-821-01	s	STOPPER, ROD
60	3-614-320-01	o	ROD, POWER SW
61	4-034-937-01	s	SCREW (M3), TAPPING

Sub Assy, Top Chassis



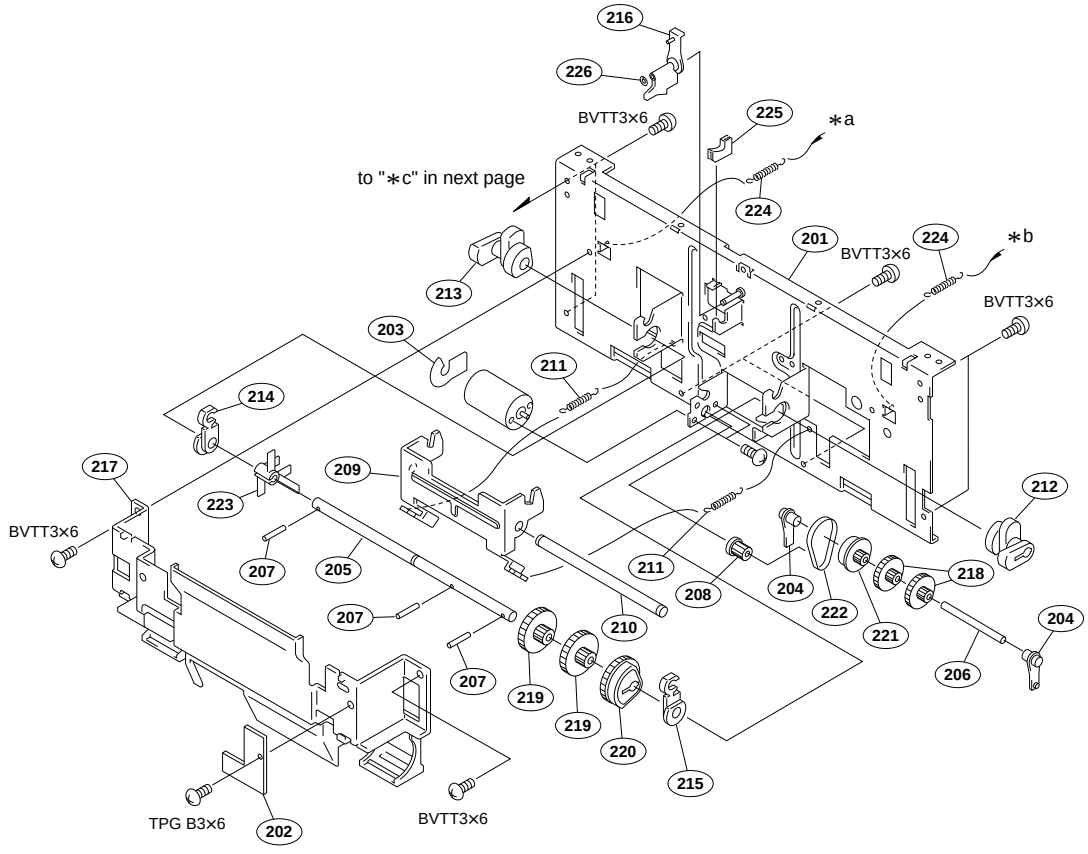
No.	Part No.	SP	Description
101	1-500-556-11	s	HEAD, THERMAL
102	1-763-007-21	s	FAN, DC
103	1-783-743-11	s	WIRE, FLAT TYPE (20 CORE)
104	1-783-744-11	s	WIRE, FLAT TYPE (22 CORE)
105	3-321-813-11	s	WASHER, COTTER POLYETHYLENE
106	3-613-743-02	s	SPRING, HELICAL TORSION D
107	3-613-744-02	s	SPRING, HELICAL TORSION E
108	3-613-745-02	o	ARM, PRESS L
109	3-613-746-02	o	ARM, PRESS R
110	3-613-747-02	o	ROLLER, PRESS F
111	3-613-749-01	o	PLATE, PRESS R
112	3-613-750-01	o	PLATE, PRESS L
113	3-613-751-01	o	PRESS LEVER R
114	3-613-753-01	o	SHAFT, HEAD PRESS
115	3-613-754-02	o	PLATE, PRESS ROLLER FL
116	3-613-755-02	o	PLATE, PRESS ROLLER FR
117	3-613-758-01	o	SHAFT, PRESS
118	3-613-759-01	o	LEVER, PRESS L
119	3-613-762-01	s	SPRING, COMPRESSION
120	3-613-766-01	o	CHASSIS, TOP
121	3-613-784-01	s	SPACER, CS
122	3-613-817-01	s	SCREW, SPECIAL M3x6
123	3-613-841-02	s	HOLDER, ROLLER
124	3-613-857-03	s	SHAFT, HEAT SINK
125	3-614-241-01	s	SPRING, COMPRESSION (HEAD)
126	4-926-219-02	s	RING (DIA. 2.3), RETAINING

Feeder Block



No.	Part No.	SP	Description
151	A-8318-879-A	o	MOUNTED CIRCUIT BOARD, SE-441
152	A-8318-882-A	o	MOUNTED CIRCUIT BOARD, PTC-98
153	X-3604-600-2	s	CHASSIS ASSY, INNER
154	1-763-134-11	s	MOTOR, STEPPING
155	1-783-746-11	o	WIRE, FLAT TYPE (16 CORE)
156	3-321-813-11	s	WASHER, COTTER POLYETHYLENE
157	3-613-714-01	s	GEAR, DOOR DRIVE1
158	3-613-716-02	s	PLATEN BEARING
159	3-613-718-01	s	TRAY, PAPER
160	3-613-722-01	s	BEARING, ARM
161	3-613-723-01	s	PLATE, SENSOR A
162	3-613-724-03	o	SHAFT, CENTER
163	3-613-728-11	o	RAIL L
164	3-613-729-11	o	RAIL R
165	3-613-740-01	s	SPRING, HELICAL TORSION A
166	3-613-756-02	s	ARM, FRICTION
167	3-613-757-01	s	COVER, FR ARM
168	3-613-768-01	s	GEAR, PLATEN
169	3-613-781-01	s	COVER, CENTER SHAFT
170	3-613-785-02	o	ARM, PRESS ROLLER
171	3-613-786-02	o	SHAFT, PRESS ROLLER
172	3-613-789-01	s	GEAR, DOOR DRIVE2
173	3-613-812-01	s	PLATEN
174	3-613-817-01	s	SCREW, SPECIAL M3x6
175	3-613-826-01	o	HOLDER, LED
176	3-613-841-02	o	HOLDER, ROLLER
177	3-613-853-02	o	ARM L (OUTSERT)
178	3-613-854-02	o	ARM R (OUTSERT)
179	3-613-928-01	s	SPRING, COMPRESSION, 0.3K
180	3-613-965-03	s	PROTECTOR R
181	3-613-966-03	s	PROTECTOR L
182	3-614-244-01	s	SPRING, PROTECTOR R
183	3-614-245-01	s	SPRING, PROTECTOR L
184	3-614-311-01	s	SPRING, DOOR L
185	3-614-312-01	s	SPRING, DOOR R
186	3-649-266-01	s	PIN, PARALLEL
187	3-703-357-05	s	PIN, PARALLEL (DIA. 1.6x16)
188	3-703-358-07	o	PIN, PARALLEL (DIA. 2x18)
189	4-926-219-02	s	RING (DIA. 2.3), RETAINING

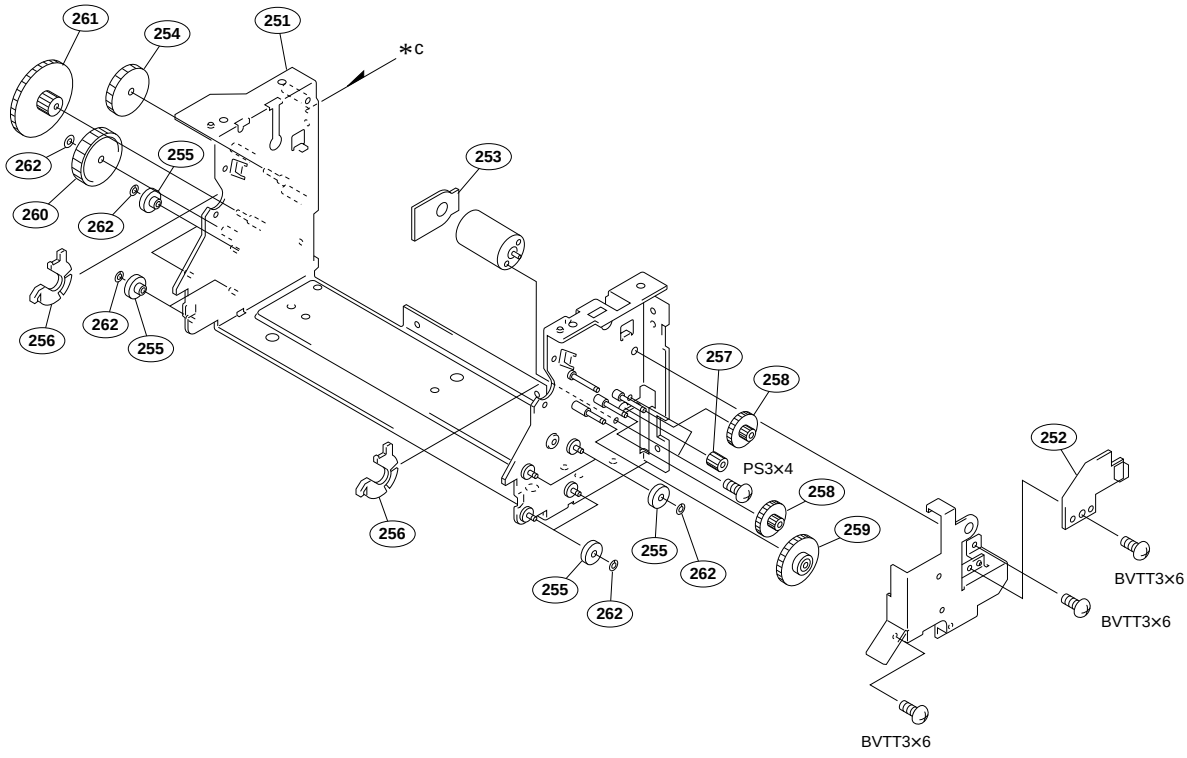
Chassis Block Assy, Rear



No.	Part No.	SP	Description
201	X-3604-603-2	s	ASSY, REAR CHASSIS
202	1-670-057-11	o	PRINTED WIRING BOARD, SE-485
203	1-670-059-11	o	PRINTED WIRINT BOARD, SU-41
204	3-613-711-01	s	BEARING, HD SHAFT
205	3-613-712-03	s	SHAFT HEAD CAM
206	3-613-713-01	o	SHAFT, HEAD DRIVE
207	3-613-715-01	s	PIN, PARALLEL12
208	3-613-742-01	s	PULLEY17
209	3-613-748-02	o	SUPPORT LEVER
210	3-613-752-01	o	SHAFT, SUPPORT LEVER
211	3-613-763-01	s	SPRING, EXTENSION
212	3-613-764-01	s	CAM, HEAD R
213	3-613-765-01	s	CAM, HEAD L
214	3-613-774-01	s	BEARING (L), HEAD CAM
215	3-613-775-01	s	BEARING (R), HEAD CAM
216	3-613-777-01	s	ARM, HEAD RELEASE
217	3-613-782-01	s	GUIDE, PAPER
218	3-613-787-01	s	GEAR, DOOR DRIVE4
219	3-613-790-01	s	GEAR, HEAD DRIVE2
220	3-613-810-01	s	GEAR, HEAD DRIVE1
221	3-613-816-01	s	PULLEY60
222	3-613-839-01	s	BELT, 70TN10
223	3-613-875-01	s	FIN, HD SENSOR SHIELD
224	3-614-280-01	s	SPRING, EXTENSION (PR 0.1)
225	3-614-317-01	s	COVER, HEAT SINK SHAFT
226	4-926-219-02	s	RING (DIA. 2.3), RETAINING

http://getMANUAL.com

Chassis Block & Gear



No.	Part No.	SP	Description
251	X-3604-601-1	s	CHASSIS ASSY, MECHANICAL
252	1-670-055-11	o	PRINTED WIRING BOARD, SE-442
253	1-670-060-11	o	PRINTED WITING BOARD, SU-42
254	3-613-719-01	s	GEAR (B), PLATEN
255	3-613-727-01	s	ROLLER, RAIL
256	3-613-737-01	o	GUIDE, PLATEN
257	3-613-780-01	s	GEAR, DOOR DRIVE5
258	3-613-787-01	s	GEAR, DOOR DRIVE4
259	3-613-788-01	s	GEAR, DOOR DRIVE3
260	3-613-813-01	s	GEAR, IDLE, PLATEN
261	3-613-814-01	s	GEAR A, PLATEN
262	4-926-219-02	s	RING (DIA. 2.3), RETAINING

7-3. ELECTRICAL PARTS LIST

KY-421 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8318-883-A	o	MOUNTED CIRCUIT BOARD, KY-421
CN601	1-784-978-11	o	CONNECTOR, FLEXIBLE 10P
S601	1-572-879-11	s	SWITCH, DIP

MA-91 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8318-877-A	o	MOUNTED CIRCUIT BOARD, MA-91
BZ401	1-529-080-11	s	BUZZER, PIEZOELECTRIC
C2	1-126-934-11	s	ELECT 220uF 20% 16V
C3	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C4	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
C5	1-135-145-11	s	TANTALUM, CHIP 0.47uF 10% 35V
C6	1-104-664-11	s	ELECT 47uF 20% 25V
C7	1-126-962-11	s	ELECT 3.3uF 20% 50V
C8	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C9	1-163-220-11	s	CERAMIC 3PF 0.25PF 50V
C10	1-162-907-11	s	CERAMIC, CHIP 2PF 50V
C11	1-162-910-11	s	CERAMIC, CHIP 5PF 0.25PF 50V
C12	1-104-664-11	s	ELECT 47uF 20% 25V
C13	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C16	1-162-923-11	s	CERAMIC, CHIP 47PF 5% 50V
C23	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C24	1-162-966-11	s	CERAMIC, CHIP 0.0022uF 10% 50V
C25	1-162-970-11	s	CERAMIC, CHIP 0.01uF 10% 25V
C26	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
C27	1-126-962-11	s	ELECT 3.3uF 20% 50V
C28	1-126-964-11	s	ELECT 10uF 20% 50V
C29	1-104-664-11	s	ELECT 47uF 20% 25V
C30	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C31	1-104-664-11	s	ELECT 47uF 20% 25V
C32	1-162-966-11	s	CERAMIC, CHIP 0.0022uF 10% 50V
C33	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C34	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C35	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C36	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C37	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C38	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C39	1-126-960-11	s	ELECT 1uF 20% 50V
C40	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C41	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C42	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C43	1-126-934-11	s	ELECT 220uF 20% 16V
C44	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C46	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C47	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C48	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C49	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C50	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C51	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C52	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C53	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C54	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C55	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C56	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C57	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C101	1-126-964-11	s	ELECT 10uF 20% 50V
C102	1-126-964-11	s	ELECT 10uF 20% 50V
C104	1-126-964-11	s	ELECT 10uF 20% 50V
C105	1-126-964-11	s	ELECT 10uF 20% 50V
C106	1-126-964-11	s	ELECT 10uF 20% 50V
C107	1-126-964-11	s	ELECT 10uF 20% 50V
C108	1-126-964-11	s	ELECT 10uF 20% 50V
C109	1-126-964-11	s	ELECT 10uF 20% 50V

(MA-91 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C110	1-104-664-11	s	ELECT 47uF 20% 25V
C112	1-104-664-11	s	ELECT 47uF 20% 25V
C201	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C202	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C203	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C204	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C205	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C206	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C207	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C208	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C209	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C210	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C211	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C212	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C215	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C216	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C217	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C218	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C219	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C220	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C221	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C222	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C258	1-126-964-11	s	ELECT 10uF 20% 50V
C259	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C404	1-104-664-11	s	ELECT 47uF 20% 25V
C405	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C406	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C407	1-126-964-11	s	ELECT 10uF 20% 50V
C408	1-164-227-11	s	CERAMIC 0.022uF 10% 25V
C409	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C410	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C411	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C412	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C413	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C414	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C415	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C416	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C417	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C418	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C419	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C420	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C421	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C422	1-104-664-11	s	ELECT 47uF 20% 25V
C423	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C430	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C431	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C432	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C433	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C434	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C435	1-126-964-11	s	ELECT 10uF 20% 50V
C460	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C461	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C462	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C501	1-126-925-11	s	ELECT 470uF 20% 10V
C502	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C503	1-126-925-11	s	ELECT 470uF 20% 10V
C504	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C507	1-126-941-11	s	ELECT 470uF 20% 25V
C508	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V

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Ref. No. or Q'ty	Part No.	SP	Description
C509	1-126-941-11	s	ELECT 470uF 20% 25V
C510	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C511	1-104-664-11	s	ELECT 47uF 20% 25V
C512	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C515	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C516	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C517	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C518	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C519	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C520	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C521	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C522	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C523	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C524	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C525	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C526	1-162-917-11	s	CERAMIC, CHIP 15PF 5% 50V
C527	1-162-917-11	s	CERAMIC, CHIP 15PF 5% 50V
C528	1-126-964-11	s	ELECT 10uF 20% 50V
C530	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C531	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C601	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C602	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C603	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C604	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C605	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C606	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C607	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C608	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C609	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C610	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C611	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C612	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C613	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C614	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C615	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C616	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C617	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C618	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C619	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C620	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C621	1-104-664-11	s	ELECT 47uF 20% 25V
C622	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C623	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C624	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C625	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C626	1-164-156-11	s	CERAMIC, CHIP 0.1uF 25V
C627	1-104-664-11	s	ELECT 47uF 20% 25V
C628	1-104-664-11	s	ELECT 47uF 20% 25V
C629	1-104-664-11	s	ELECT 47uF 20% 25V
C630	1-104-664-11	s	ELECT 47uF 20% 25V
C631	1-104-664-11	s	ELECT 47uF 20% 25V
C635	1-162-919-11	s	CERAMIC, CHIP 22PF 5% 50V
C636	1-162-919-11	s	CERAMIC, CHIP 22PF 5% 50V
C640	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
C641	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
C645	1-162-921-11	s	CERAMIC, CHIP 33PF 5% 50V
CN1	1-691-431-11	s	CONNECTOR ASSY, BNC
CN201	1-564-708-11	o	CONNECTOR (SMALL TYPE) 6P, MALE

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Ref. No. or Q'ty	Part No.	SP	Description
CN202	1-562-883-11	o	CONNECTOR, FPC 20P, FEMALE
CN204	1-764-783-11	o	HOUSING 26P
CN205	1-506-705-11	o	CONNECTOR POST HEADER,ILG (6P)
CN206	1-778-386-11	o	HOUSING 16P
CN207	1-784-979-11	s	HOUSING 22P
CN208	1-564-009-11	o	PIN, CONNECTOR 10P
CN209	1-562-991-11	o	CONNECTOR 22P, FEMALE
CN211	1-564-005-11	o	CONNECTOR 6P, MALE
D201	8-719-820-41	s	DIODE 1SS302
D202	8-719-820-41	s	DIODE 1SS302
D203	8-719-820-41	s	DIODE 1SS302
D204	8-719-820-41	s	DIODE 1SS302
D205	8-719-820-41	s	DIODE 1SS302
D206	8-719-820-41	s	DIODE 1SS302
D207	8-719-820-41	s	DIODE 1SS302
D208	8-719-820-41	s	DIODE 1SS302
D209	8-719-820-41	s	DIODE 1SS302
D210	8-719-820-41	s	DIODE 1SS302
D211	8-719-820-41	s	DIODE 1SS302
D212	8-719-820-41	s	DIODE 1SS302
D213	8-719-820-41	s	DIODE 1SS302
D214	8-719-820-41	s	DIODE 1SS302
D215	8-719-820-41	s	DIODE 1SS302
D216	8-719-820-41	s	DIODE 1SS302
D217	8-719-820-41	s	DIODE 1SS302
D218	8-719-820-41	s	DIODE 1SS302
D219	8-719-820-41	s	DIODE 1SS302
D235	8-719-820-41	s	DIODE 1SS302
D236	8-719-820-41	s	DIODE 1SS302
D237	8-719-820-41	s	DIODE 1SS302
D238	8-719-820-41	s	DIODE 1SS302
D401	8-719-820-41	s	DIODE 1SS302
D402	8-719-200-02	s	DIODE 10E-2
D403	8-719-104-34	s	DIODE 1S2836
D404	8-719-104-34	s	DIODE 1S2836
D405	8-719-104-34	s	DIODE 1S2836
D406	8-719-104-34	s	DIODE 1S2836
D408	8-719-104-34	s	DIODE 1S2836
D409	8-719-104-34	s	DIODE 1S2836
D410	8-719-820-41	s	DIODE 1SS302
D411	8-719-820-41	s	DIODE 1SS302
D412	8-719-820-41	s	DIODE 1SS302
D413	8-719-820-41	s	DIODE 1SS302
D414	8-719-820-41	s	DIODE 1SS302
D415	8-719-820-41	s	DIODE 1SS302
D416	8-719-820-41	s	DIODE 1SS302
D417	8-719-820-41	s	DIODE 1SS302
D501	8-719-820-41	s	DIODE 1SS302
D502	8-719-820-41	s	DIODE 1SS302
D503	8-719-820-41	s	DIODE 1SS302
F401	⚠ 1-532-777-21	s	FUSE, MICRO (SECONDARY) 1.25A 125V
FB501	1-410-397-21	s	FERRITE BEAD INDUCTOR 1.1uH
FB502	1-410-397-21	s	FERRITE BEAD INDUCTOR 1.1uH
FL1	1-409-431-11	s	COIL, TRAP 3.58MHz
FL2	1-409-447-11	s	COIL, TRAP 4.43MHz
IC1	8-759-710-07	s	IC NJM2234M

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Ref. No. or Q'ty	Part No.	SP	Description
IC2	8-759-304-10	s	IC HA11465A
IC4	8-759-983-69	s	IC LM358PS
IC5	8-759-300-71	s	IC MC14053BF
IC6	8-759-296-57	s	IC LM1201MX
IC7	8-759-528-24	s	IC MB40C568HPF-ER
IC402	8-759-973-95	s	IC BA6219B
IC403	8-759-973-95	s	IC BA6219B
IC404	8-759-983-69	s	IC LM358PS
IC405	8-759-925-80	s	IC SN74HC14ANS
IC406	8-759-925-80	s	IC SN74HC14ANS
IC407	8-759-925-80	s	IC SN74HC14ANS
IC502	8-759-278-46	s	IC PST600DMT-T1
IC503	8-759-231-58	s	IC TA7812S
IC505	8-759-531-75	s	IC HD6473042F12-UP960SYS-V1.0
IC601	8-759-498-91	s	IC CXD8726R
IC603	8-759-486-03	s	IC TMS418160A-60DZ
IC604	8-759-287-50	s	IC CXD8932Q
IC606	8-759-359-12	s	IC DS1000Z-100
J501	1-507-967-11	s	JACK
L2	1-410-369-11	s	INDUCTOR CHIP 1uH
L3	1-410-369-11	s	INDUCTOR CHIP 1uH
L8	1-408-777-00	s	INDUCTOR CHIP 10uH
L201	1-408-777-00	s	INDUCTOR CHIP 10uH
L202	1-408-777-00	s	INDUCTOR CHIP 10uH
L204	1-408-777-00	s	INDUCTOR CHIP 10uH
L205	1-408-777-00	s	INDUCTOR CHIP 10uH
L206	1-408-777-00	s	INDUCTOR CHIP 10uH
L210	1-408-777-00	s	INDUCTOR CHIP 10uH
L401	1-408-777-00	s	INDUCTOR CHIP 10uH
L403	1-408-777-00	s	INDUCTOR CHIP 10uH
L404	1-408-777-00	s	INDUCTOR CHIP 10uH
L405	1-408-777-00	s	INDUCTOR CHIP 10uH
L406	1-408-777-00	s	INDUCTOR CHIP 10uH
L407	1-408-777-00	s	INDUCTOR CHIP 10uH
L408	1-408-777-00	s	INDUCTOR CHIP 10uH
L409	1-408-777-00	s	INDUCTOR CHIP 10uH
L501	1-408-777-00	s	INDUCTOR CHIP 10uH
L502	1-408-797-11	s	INDUCTOR CHIP 470uH
L503	1-408-765-21	s	INDUCTOR CHIP 1uH
L601	1-408-777-00	s	INDUCTOR CHIP 10uH
L602	1-408-777-00	s	INDUCTOR CHIP 10uH
Q2	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q3	8-729-216-22	s	TRANSISTOR 2SA1162
Q4	8-729-402-81	s	TRANSISTOR XN4501
Q5	8-729-216-22	s	TRANSISTOR 2SA1162
Q6	8-729-402-81	s	TRANSISTOR XN4501
Q7	8-729-035-96	s	TRANSISTOR XN4402-(TX)
Q8	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q11	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q12	8-729-402-84	s	TRANSISTOR XN4601
Q13	8-729-035-96	s	TRANSISTOR XN4402-(TX)
Q14	8-729-402-81	s	TRANSISTOR XN4501
Q16	8-729-402-84	s	TRANSISTOR XN4601
Q17	8-729-402-84	s	TRANSISTOR XN4601
Q18	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q19	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q21	8-729-402-81	s	TRANSISTOR XN4501

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Ref. No. or Q'ty	Part No.	SP	Description
Q40	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q41	8-729-901-00	s	TRANSISTOR DTC124EK
Q42	8-729-901-00	s	TRANSISTOR DTC124EK
Q201	8-729-901-00	s	TRANSISTOR DTC124EK
Q401	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q403	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q404	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q405	8-729-017-80	s	TRANSISTOR 2SD992-Z
Q406	8-729-017-80	s	TRANSISTOR 2SD992-Z
Q407	8-729-017-80	s	TRANSISTOR 2SD992-Z
Q408	8-729-017-80	s	TRANSISTOR 2SD992-Z
Q409	8-729-017-80	s	TRANSISTOR 2SD992-Z
Q410	8-729-140-75	s	TRANSISTOR 2SD999-CLCK
Q501	8-729-901-00	s	TRANSISTOR DTC124EK
R1	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R2	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R6	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R7	1-216-815-11	s	METAL, CHIP 330 5% 1/16W
R8	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R9	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R10	1-216-815-11	s	METAL, CHIP 330 5% 1/16W
R11	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R12	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R13	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R14	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R15	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R16	1-216-815-11	s	METAL, CHIP 330 5% 1/16W
R17	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R18	1-216-803-11	s	METAL, CHIP 33 5% 1/16W
R19	1-216-803-11	s	METAL, CHIP 33 5% 1/16W
R20	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R21	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R22	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R23	1-216-844-11	s	METAL, CHIP 82K 5% 1/16W
R24	1-216-819-11	s	METAL, CHIP 680 5% 1/16W
R25	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R26	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R27	1-216-822-11	s	METAL, CHIP 1.2K 5% 1/16W
R28	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R29	1-216-832-11	s	METAL, CHIP 8.2K 5% 1/16W
R30	1-216-823-11	s	METAL, CHIP 1.5K 5% 1/16W
R31	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R32	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R33	1-216-812-11	s	METAL, CHIP 180 5% 1/16W
R34	1-216-803-11	s	METAL, CHIP 33 5% 1/16W
R35	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R36	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R37	1-216-819-11	s	METAL, CHIP 680 5% 1/16W
R38	1-216-819-11	s	METAL, CHIP 680 5% 1/16W
R39	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R53	1-216-803-11	s	METAL, CHIP 33 5% 1/16W
R56	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R57	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R58	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R59	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R60	1-216-856-11	s	METAL, CHIP 820K 5% 1/16W
R61	1-218-871-11	s	METAL, CHIP 10K 0.5% 1/16W
R62	1-218-871-11	s	METAL, CHIP 10K 0.5% 1/16W
R63	1-216-803-11	s	METAL, CHIP 33 5% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R64	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R65	1-216-829-11	s	METAL, CHIP 4.7K 5% 1/16W
R66	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R67	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R68	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R69	1-216-826-11	s	METAL, CHIP 2.7K 5% 1/16W
R70	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R71	1-218-879-11	s	METAL, CHIP 22K 0.5% 1/16W
R72	1-216-830-11	s	METAL, CHIP 5.6K 5% 1/16W
R73	1-216-832-11	s	METAL, CHIP 8.2K 5% 1/16W
R74	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R75	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R76	1-216-831-11	s	METAL, CHIP 6.8K 5% 1/16W
R81	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R82	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R83	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R85	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R86	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R87	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R88	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R89	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R90	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R91	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R93	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R94	1-216-812-11	s	METAL, CHIP 180 5% 1/16W
R95	1-216-806-11	s	METAL, CHIP 56 5% 1/16W
R96	1-216-814-11	s	METAL, CHIP 270 5% 1/16W
R98	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R101	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R102	1-216-832-11	s	METAL, CHIP 8.2K 5% 1/16W
R103	1-216-831-11	s	METAL, CHIP 6.8K 5% 1/16W
R104	1-216-842-11	s	METAL, CHIP 56K 5% 1/16W
R105	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R106	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R107	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R108	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R109	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R110	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R111	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R112	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R121	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R122	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R123	1-218-845-11	s	METAL, CHIP 820 0.50%
R124	1-218-847-11	s	METAL, CHIP 1K 0.5% 1/16W
R125	1-218-833-11	s	METAL, CHIP 270 0.50% 1/16W
R127	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R128	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R129	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R130	1-216-824-11	s	METAL, CHIP 1.8K 5% 1/16W
R131	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R132	1-216-818-11	s	METAL, CHIP 560 5% 1/16W
R133	1-218-861-11	s	METAL, CHIP 3.9K 0.5% 1/16W
R150	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R151	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R154	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R159	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R160	1-414-385-11	s	FERRITE 0UH
R161	1-414-385-11	s	FERRITE 0UH
R201	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W

(MA-91 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R202	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R203	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R204	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R205	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R206	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R207	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R208	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R209	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R211	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R212	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R213	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R214	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R215	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R216	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R217	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R218	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R219	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R221	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R222	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R223	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R224	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R225	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R226	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R227	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R228	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R229	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R230	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R231	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R232	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R235	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R236	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R237	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R238	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R239	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R240	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R241	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R242	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R245	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R246	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R247	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R248	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R249	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R250	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R251	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R252	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R253	1-216-815-11	s	METAL, CHIP 330 5% 1/16W
R254	1-216-823-11	s	METAL, CHIP 1.5K 5% 1/16W
R255	1-216-823-11	s	METAL, CHIP 1.5K 5% 1/16W
R256	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R257	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R258	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R259	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R260	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R261	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R262	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R263	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R265	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R266	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R267	1-216-864-11	s	METAL, CHIP 0 5% 1/16W

(MA-91 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R268	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R271	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R272	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R273	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R274	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R275	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R276	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R277	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R278	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R279	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R280	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R281	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R282	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R283	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R284	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R285	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R401	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R402	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R403	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R408	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R409	1-216-828-11	s	METAL, CHIP 3.9K 5% 1/16W
R410	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R412	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R413	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R414	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R416	1-216-818-11	s	METAL, CHIP 560 5% 1/16W
R417	1-216-818-11	s	METAL, CHIP 560 5% 1/16W
R418	1-216-818-11	s	METAL, CHIP 560 5% 1/16W
R419	1-216-818-11	s	METAL, CHIP 560 5% 1/16W
R420	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R421	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R422	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R423	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R424	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R425	1-216-835-11	s	METAL, CHIP 15K 5% 1/16W
R426	1-216-837-11	s	METAL, CHIP 22K 5% 1/16W
R427	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R428	1-216-847-11	s	METAL, CHIP 150K 5% 1/16W
R429	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R430	1-216-828-11	s	METAL, CHIP 3.9K 5% 1/16W
R432	1-216-845-11	s	METAL, CHIP 100K 5% 1/16W
R433	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R434	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R435	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R436	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R437	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R438	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R439	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R440	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R441	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R442	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R443	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R444	1-216-811-11	s	METAL, CHIP 150 5% 1/16W
R445	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R447	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R448	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R449	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R450	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R451	1-216-809-11	s	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	SP	Description
R452	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R453	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R454	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R455	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R457	1-207-678-00	s	WIREWOUND 10 10% 5W
R460	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R461	1-216-835-11	s	METAL, CHIP 15K 5% 1/16W
R462	1-216-838-11	s	METAL, CHIP 27K 5% 1/16W
R463	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R465	1-216-825-11	s	METAL, CHIP 2.2K 5% 1/16W
R466	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R470	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R471	1-217-294-00	s	WIREWOUND 4.7 10% 5W
R472	1-217-294-00	s	WIREWOUND 4.7 10% 5W
R473	1-217-294-00	s	WIREWOUND 4.7 10% 5W
R501	1-216-817-11	s	METAL, CHIP 470 5% 1/16W
R502	1-216-824-11	s	METAL, CHIP 1.8K 5% 1/16W
R504	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R505	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R506	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R507	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R508	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R509	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R510	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R511	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R512	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R513	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R514	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R515	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R516	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R517	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R522	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R523	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R524	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R525	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R526	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R527	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R528	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R529	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R530	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R531	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R532	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R533	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R534	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R535	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R536	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R537	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R538	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R539	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R540	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R541	1-216-864-11	s	METAL, CHIP 0 5% 1/16W
R542	1-414-385-11	s	FERRITE 0UH
R543	1-414-385-11	s	FERRITE 0UH
R544	1-414-385-11	s	FERRITE 0UH
R545	1-414-385-11	s	FERRITE 0UH
R546	1-414-385-11	s	FERRITE 0UH
R547	1-414-385-11	s	FERRITE 0UH
R548	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R549	1-414-385-11	s	FERRITE 0UH

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Ref. No. or Q'ty	Part No.	SP	Description
R550	1-414-385-11	s	FERRITE 0UH
R551	1-414-385-11	s	FERRITE 0UH
R552	1-414-385-11	s	FERRITE 0UH
R553	1-414-385-11	s	FERRITE 0UH
R554	1-414-385-11	s	FERRITE 0UH
R555	1-414-385-11	s	FERRITE 0UH
R556	1-414-385-11	s	FERRITE 0UH
R557	1-414-385-11	s	FERRITE 0UH
R558	1-414-385-11	s	FERRITE 0UH
R559	1-414-385-11	s	FERRITE 0UH
R560	1-414-385-11	s	FERRITE 0UH
R561	1-414-385-11	s	FERRITE 0UH
R562	1-414-385-11	s	FERRITE 0UH
R563	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R565	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R566	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R567	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R568	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R569	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R570	1-414-385-11	s	FERRITE 0UH
R571	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R572	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R573	1-414-385-11	s	FERRITE 0UH
R574	1-414-385-11	s	FERRITE 0UH
R575	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R576	1-216-813-11	s	METAL, CHIP 220 5% 1/16W
R577	1-216-827-11	s	METAL, CHIP 3.3K 5% 1/16W
R578	1-414-385-11	s	FERRITE 0UH
R579	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R580	1-216-833-11	s	METAL, CHIP 10K 5% 1/16W
R581	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R582	1-216-821-11	s	METAL, CHIP 1K 5% 1/16W
R601	1-414-385-11	s	FERRITE 0UH
R602	1-414-385-11	s	FERRITE 0UH
R603	1-414-385-11	s	FERRITE 0UH
R604	1-414-385-11	s	FERRITE 0UH
R605	1-414-385-11	s	FERRITE 0UH
R606	1-414-385-11	s	FERRITE 0UH
R607	1-414-385-11	s	FERRITE 0UH
R608	1-414-385-11	s	FERRITE 0UH
R609	1-414-385-11	s	FERRITE 0UH
R610	1-414-385-11	s	FERRITE 0UH
R611	1-414-385-11	s	FERRITE 0UH
R612	1-414-385-11	s	FERRITE 0UH
R613	1-414-385-11	s	FERRITE 0UH
R614	1-414-385-11	s	FERRITE 0UH
R615	1-414-385-11	s	FERRITE 0UH
R616	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R618	1-414-385-11	s	FERRITE 0UH
R619	1-414-385-11	s	FERRITE 0UH
R630	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R631	1-216-857-11	s	METAL, CHIP 1M 5% 1/16W
R640	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R641	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
R645	1-216-809-11	s	METAL, CHIP 100 5% 1/16W
RV2	1-241-178-21	s	RES, ADJ METAL, CHIP 4.7K
RV3	1-238-087-11	s	RES, ADJ, 1K
RV4	1-238-090-11	s	RES, ADJ, 10K
RV5	1-241-092-11	s	RES, ADJ METAL, CHIP 47K

(MA-91 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
RV6	1-241-092-11	s	RES, ADJ METAL, CHIP 47K
RV401	1-238-090-11	s	RES, ADJ, 10K
S501	1-571-907-31	s	SWITCH, DIP
X501	1-760-337-21	s	VIBRATOR, CRYSTAL
X601	1-767-425-21	s	CRYSTAL 23.0400MHz

PTC-98 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8318-882-A	o	MOUNTED CIRCUIT BOARD, PTC-98
1pc	3-613-826-01	o	HOLDER,LED
CN301	1-568-238-11	s	CONNECTOR, FPC (ZIF) 16P
CN302	1-784-978-11	o	CONNECTOR, FLEXIBLE 10P
D301	8-719-045-59	s	DIODE TLN225
PH301	8-749-014-55	s	IC RPI-5200

SE-441 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8318-879-A	o	MOUNTED CIRCUIT BOARD, SE-441
1pc	3-613-823-01	o	HOLDER,SENSOR
CN201	1-691-199-21	s	CONNECTOR, FPC 26P
CN202	1-774-730-21	s	CONNECTOR 3P, MALE
CN203	1-774-730-21	s	CONNECTOR 3P, MALE
CN204	1-770-160-21	s	CONNECTOR 2P, MALE
CN205	1-569-775-21	s	CONNECTOR 5P, MALE
CN207	1-580-056-21	o	CONNECTOR 3P, MALE
CN210	1-568-238-11	s	CONNECTOR, FPC (ZIF) 16P
CN212	1-568-238-11	s	CONNECTOR, FPC (ZIF) 16P
PH201	8-719-052-69	s	DIODE RPI-352
PH202	8-719-052-69	s	DIODE RPI-352

SE-442 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-670-055-11	o	PRINTED WIRING BOARD, SE-442
CN401	1-569-775-21	s	CONNECTOR 5P, MALE
PH401	8-719-052-69	s	DIODE RPI-352
PH402	8-719-052-69	s	DIODE RPI-352

SE-485 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-670-057-11	o	PRINTED WIRING BOARD, SE-485
CN502	1-580-056-21	o	CONNECTOR 3P, MALE
PH502	8-719-988-59	s	PHOTO TRANSISTOR PT501A

SU-41 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-670-059-11	o	PRINTED WIRING BOARD, SU-41
CN801	1-774-730-21	s	CONNECTOR 3P, MALE

SU-42 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-670-060-11	o	PRINTED WIRING BOARD, SU-42
CN802	1-774-730-21	s	CONNECTOR 3P, MALE

FRAME

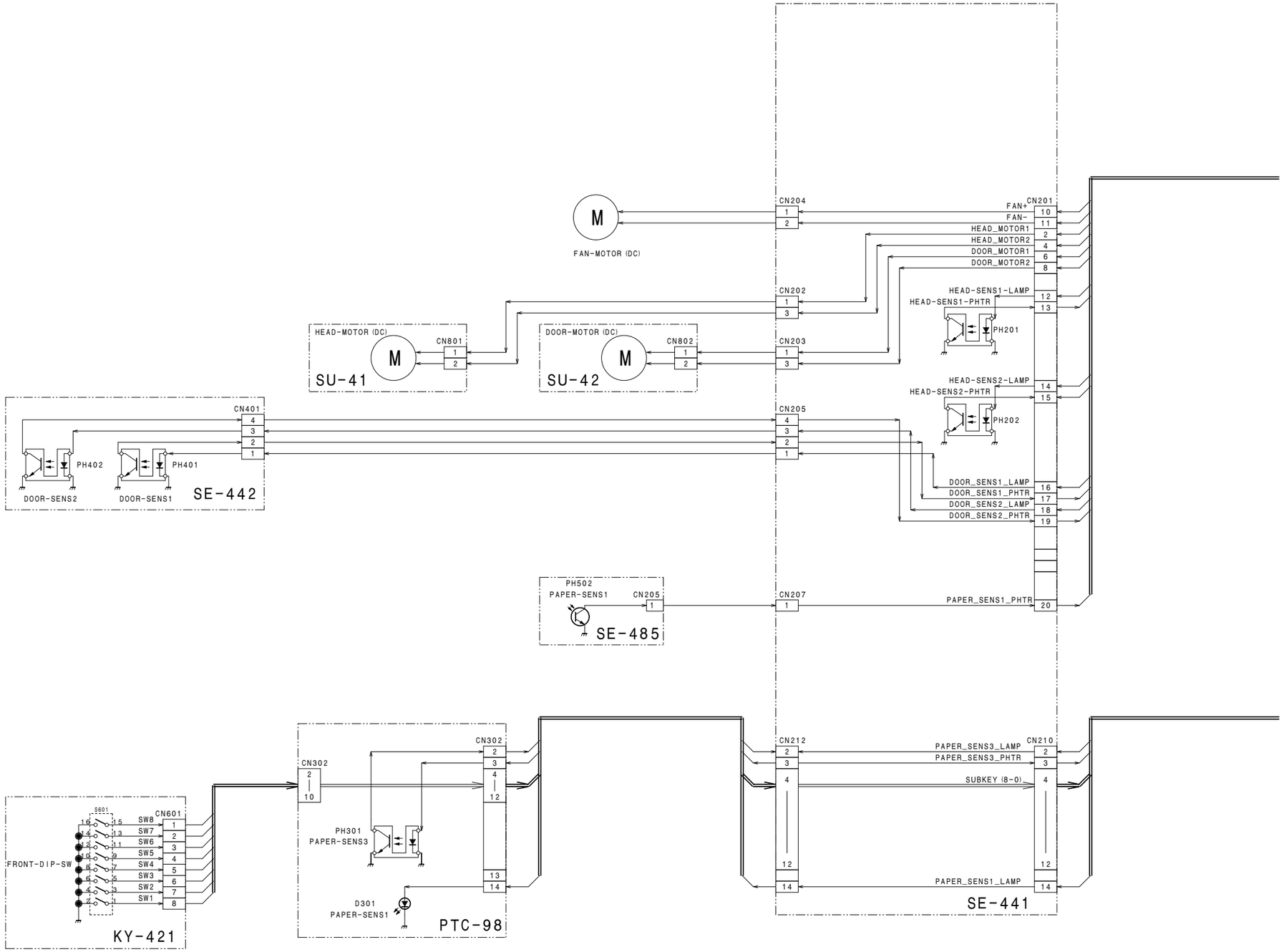
Ref. No. or Q'ty		Part No.	SP	Description
1pc	⚠	1-468-320-11	s	REGULATOR, SWITCHING
1pc		1-475-784-11	s	PANEL UNIT, FRONT
1pc		1-500-556-11	s	HEAD, THERMAL
1pc		1-543-762-11	s	BEAD, FERRITE
2pcs		1-569-618-21	o	HOUSING 3P
1pc		1-763-007-21	s	FAN, DC
1pc		1-763-134-11	s	MOTOR, STEPPING
1pc		1-783-742-11	o	WIRE, FLAT TYPE (10 CORE)
1pc		1-783-743-11	o	WIRE, FLAT TYPE (20 CORE)
1pc		1-783-744-11	o	WIRE, FLAT TYPE (22 CORE)
1pc		1-783-745-11	o	WIRE, FLAT TYPE (16 CORE)
1pc		1-783-746-11	o	WIRE, FLAT TYPE (16 CORE)
1pc		1-783-747-11	o	WIRE, FLAT TYPE (20 CORE)
1pc		1-783-749-11	o	WIRE, FLAT TYPE (26 CORE)

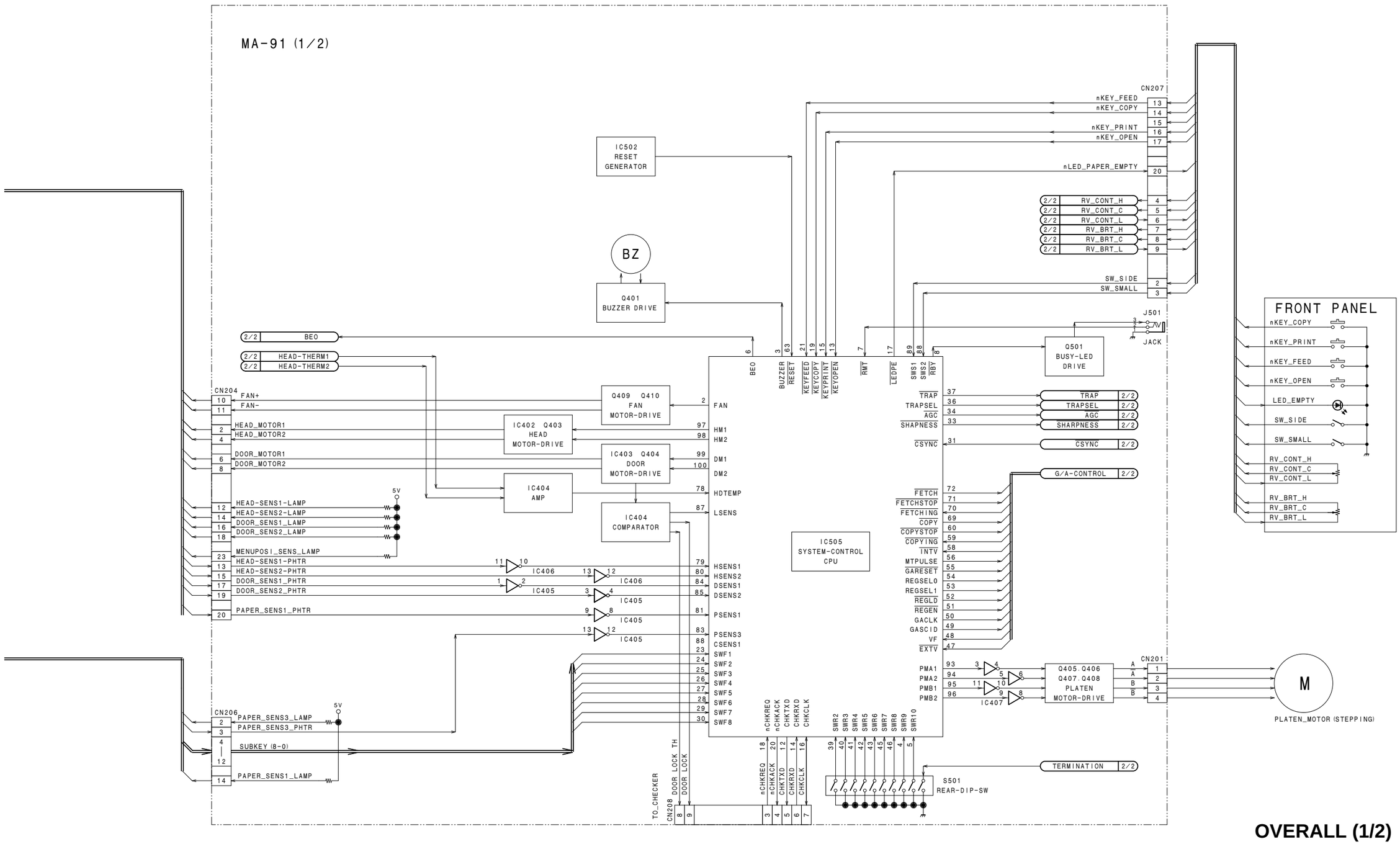
PACKING MATERIALS & SUPPLIED ACCESSORIES

Ref. No. or Q'ty		Part No.	SP	Description
1pc		1-551-475-31	s	CABLE ASSY
1pc	⚠	1-551-631-22	s	CORD, POWER(for CE)
1pc	⚠	1-559-945-11	s	CORD, POWER(for UC)
1pc		3-862-477-01	s	MANUAL, INSTRUCTION

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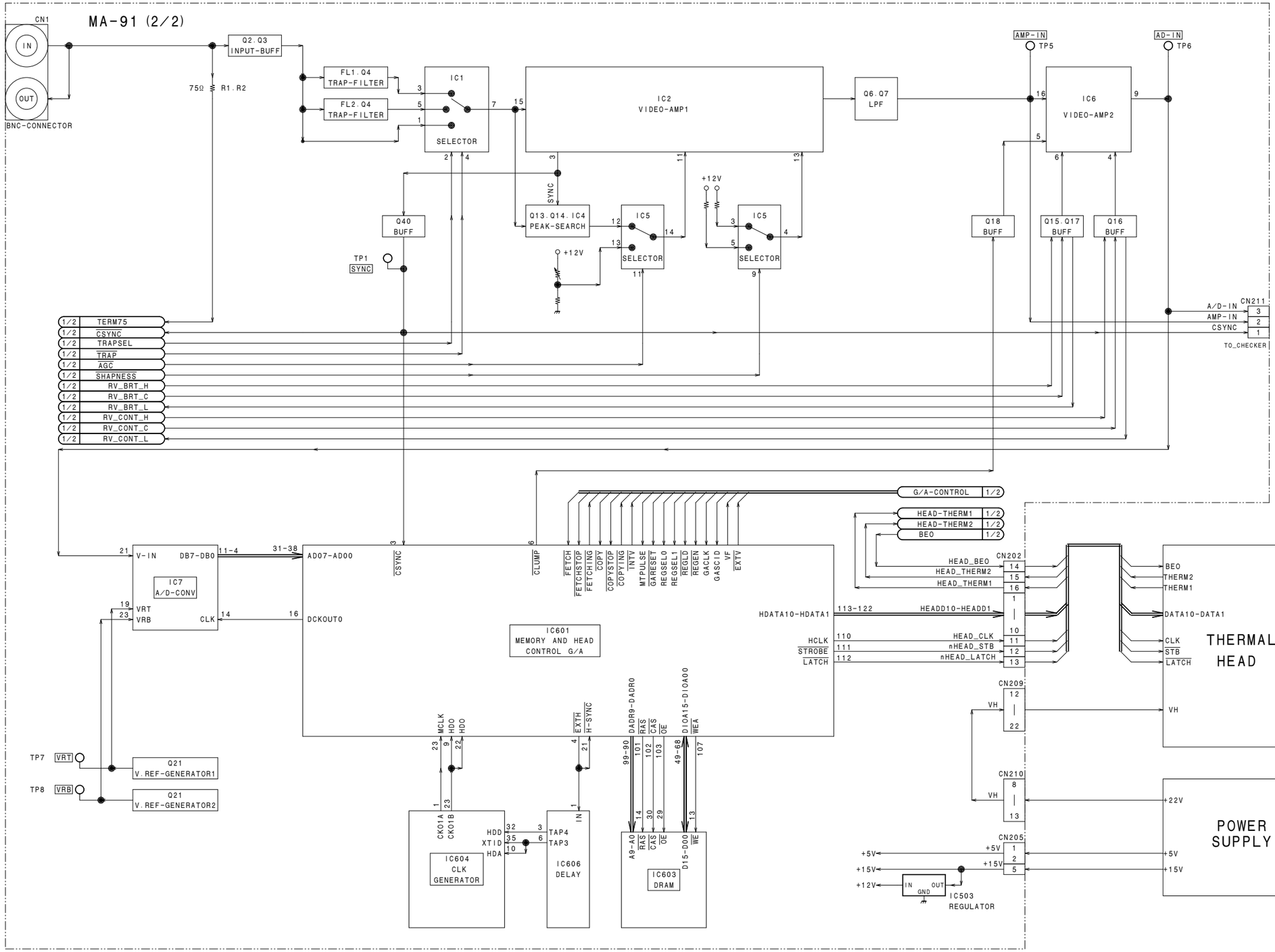
SECTION 8
BLOCK DIAGRAMS


FAN-MOTOR (DC)
HEAD-MOTOR (DC)
SU-41
DOOR-MOTOR (DC)
SU-42
SE-442
DOOR-SENS2
DOOR-SENS1
PH402
PH401
SE-485
PH502
PAPER-SENS1
KY-421
FRONT-DIP-SW
PTC-98
PH301
PAPER-SENS3
D301
PAPER-SENS1
SE-441
PH201
PH202
CN201
CN202
CN203
CN204
CN205
CN207
CN210
CN212
CN302
CN401
CN601
CN801
CN802
S601
FAN+
FAN-
HEAD_MOTOR1
HEAD_MOTOR2
DOOR_MOTOR1
DOOR_MOTOR2
HEAD-SENS1-LAMP
HEAD-SENS1-PHTR
HEAD-SENS2-LAMP
HEAD-SENS2-PHTR
DOOR_SENS1_LAMP
DOOR_SENS1_PHTR
DOOR_SENS2_LAMP
DOOR_SENS2_PHTR
PAPER_SENS1_PHTR
PAPER_SENS3_LAMP
PAPER_SENS3_PHTR
SUBKEY (8-0)
PAPER_SENS1_LAMP
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8



OVERALL (1/2)

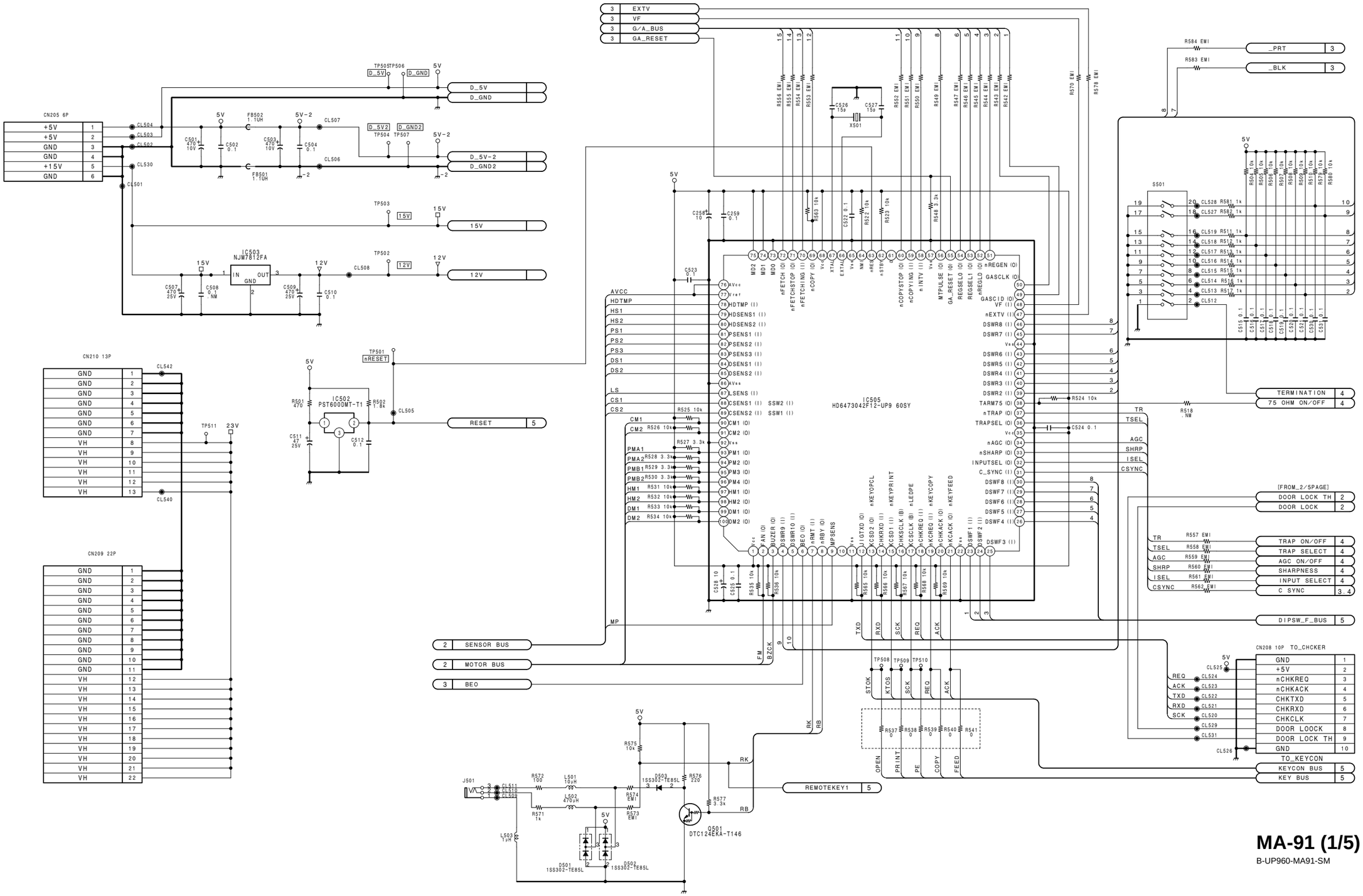
B-UP960-BLOCK-SM



OVERALL (2/2)

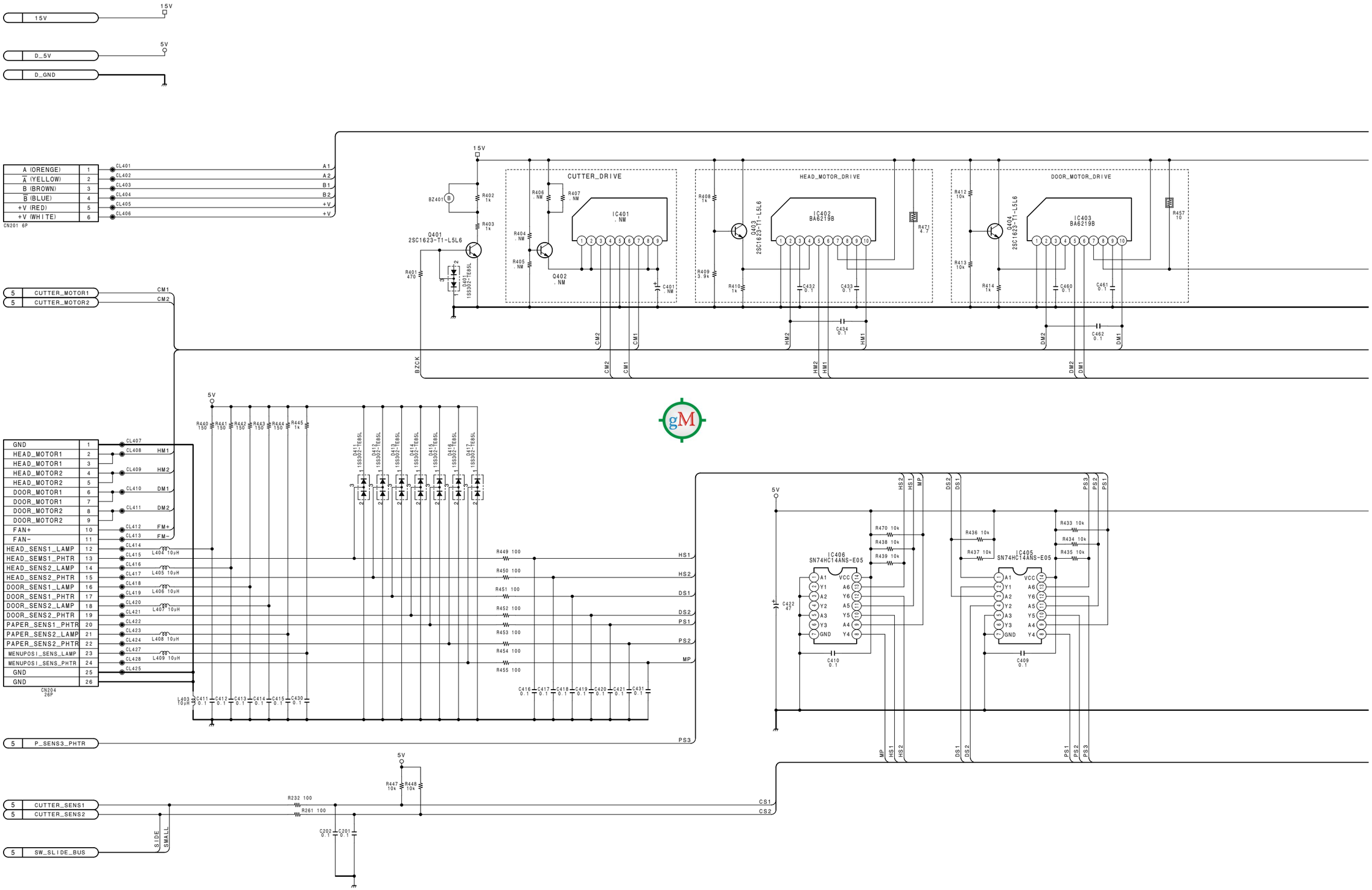
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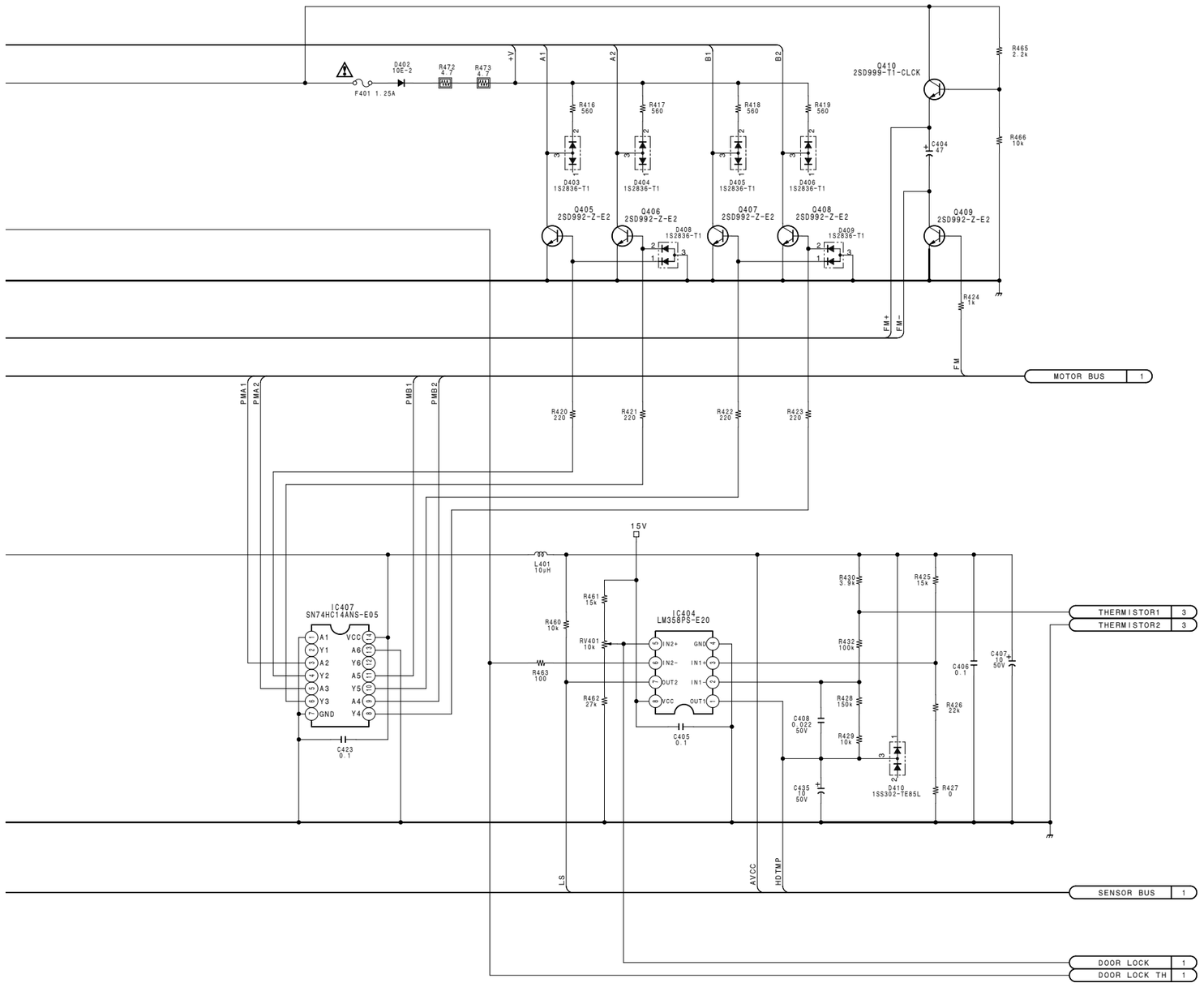
SECTION 9
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS



MA-91 (1/5)
B-UP960-MA91-SM

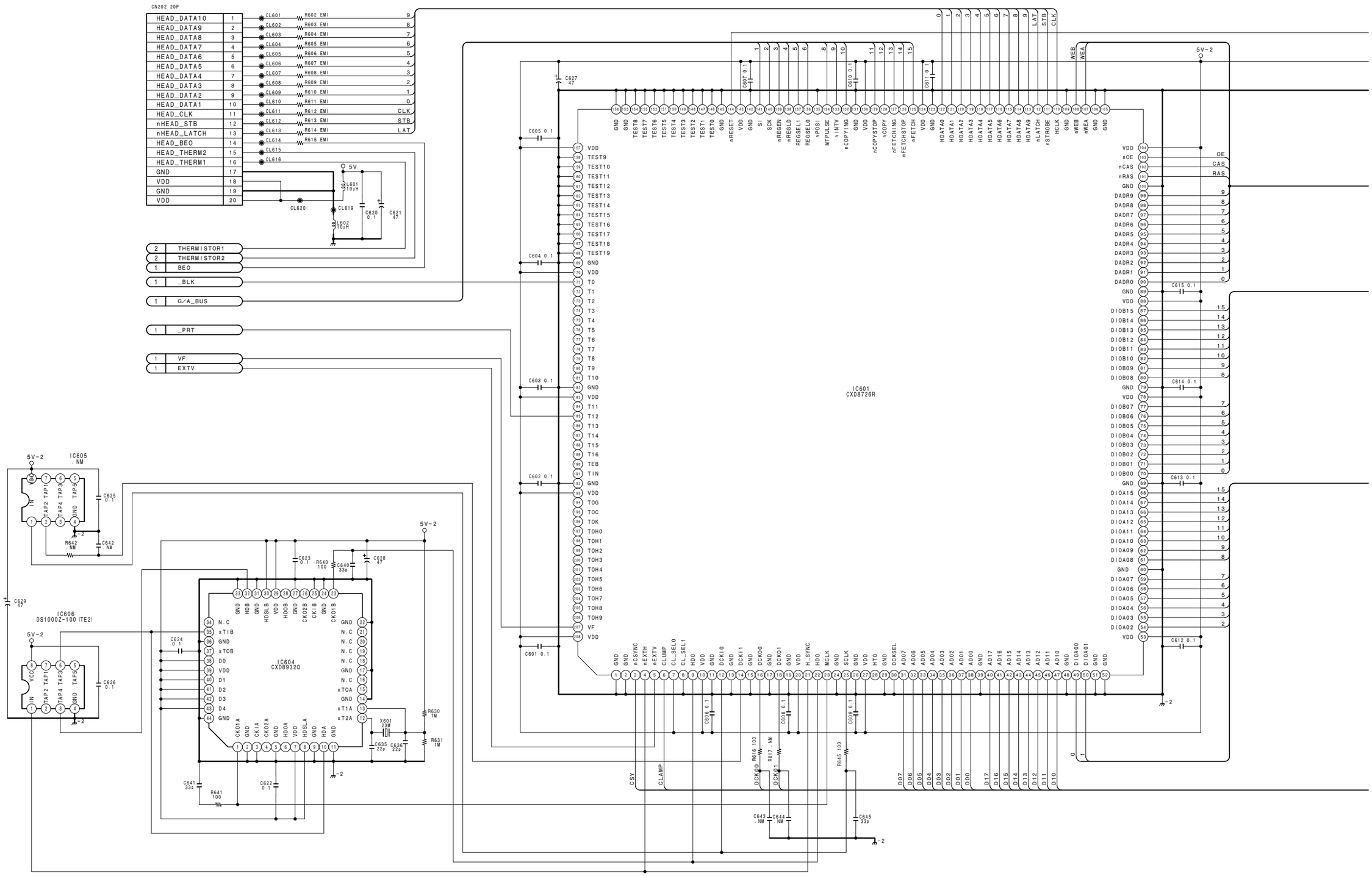
UP-960(UC)
UP-960CE(CE)


15V
D_5V
D_GND
A (ORENGE) 1
A (YELLOW) 2
B (BROWN) 3
B (BLUE) 4
+V (RED) 5
+V (WHITE) 6
CN201 6P
CL401 A1
CL402 A2
CL403 B1
CL404 B2
CL405 +V
CL406 +V
5 CUTTER_MOTOR1 CM1
5 CUTTER_MOTOR2 CM2
BZCK
CUTTER_DRIVE
HEAD_MOTOR_DRIVE
DOOR_MOTOR_DRIVE
IC401 NM
IC402 BA6219B
IC403 BA6219B
Q401 2SC1623-T1-L5L6
Q402 NM
Q403 2SC1623-T1-L5L6
Q404 2SC1623-T1-L5L6
BZ401
D401 1SS302TE85L
R401 470
R402 1k
R403 1k
R404 NM
R405 NM
R406 NM
R407 NM
R408 1k
R409 3.9k
R410 1k
R412 10k
R413 10k
R414 1k
R457 10
R471 4.7
C401 NM
C432 0.1
C433 0.1
C434 0.1
C460 0.1
C461 0.1
C462 0.1
CM2
CM1
HM2
HM1
DM2
DM1
5V
GND 1
HEAD_MOTOR1 2
HEAD_MOTOR1 3
HEAD_MOTOR2 4
HEAD_MOTOR2 5
DOOR_MOTOR1 6
DOOR_MOTOR1 7
DOOR_MOTOR2 8
DOOR_MOTOR2 9
FAN+ 10
FAN- 11
HEAD_SENS1_LAMP 12
HEAD_SEMS1_PHTR 13
HEAD_SENS2_LAMP 14
HEAD_SENS2_PHTR 15
DOOR_SENS1_LAMP 16
DOOR_SENS1_PHTR 17
DOOR_SENS2_LAMP 18
DOOR_SENS2_PHTR 19
PAPER_SENS1_PHTR 20
PAPER_SENS2_LAMP 21
PAPER_SENS2_PHTR 22
MENUPOSI_SENS_LAMP 23
MENUPOSI_SENS_PHTR 24
GND 25
GND 26
CN204 26P
CL407
CL408 HM1
CL409 HM2
CL410 DM1
CL411 DM2
CL412 FM+
CL413 FM-
CL414
CL415
CL416
CL417
CL418
CL419
CL420
CL421
CL422
CL423
CL424
CL427
CL428
CL425
L404 10µH
L405 10µH
L406 10µH
L407 10µH
L408 10µH
L409 10µH
R440 150
R441 150
R442 150
R443 150
R444 150
R445 1k
D411 1SS302TE85L
D412 1SS302TE85L
D413 1SS302TE85L
D414 1SS302TE85L
D415 1SS302TE85L
D416 1SS302TE85L
D417 1SS302TE85L
R449 100
R450 100
R451 100
R452 100
R453 100
R454 100
R455 100
HS1
HS2
DS1
DS2
PS1
PS2
MP
PS3
C411 0.1
C412 0.1
C413 0.1
C414 0.1
C415 0.1
C430 0.1
C416 0.1
C417 0.1
C418 0.1
C419 0.1
C420 0.1
C421 0.1
C431 0.1
5 P_SENS3_PHTR
IC406 SN74HC14ANS-E05
IC405 SN74HC14ANS-E05
R470 10k
R438 10k
R439 10k
R436 10k
R437 10k
R433 10k
R434 10k
R435 10k
C422 47
C410 0.1
C409 0.1
5 CUTTER_SENS1
5 CUTTER_SENS2
5 SW_SLIDE_BUS
SIDE
SMALL
R232 100
R261 100
R447 10k
R448 10k
C202 0.1
C201 0.1
CS1
CS2

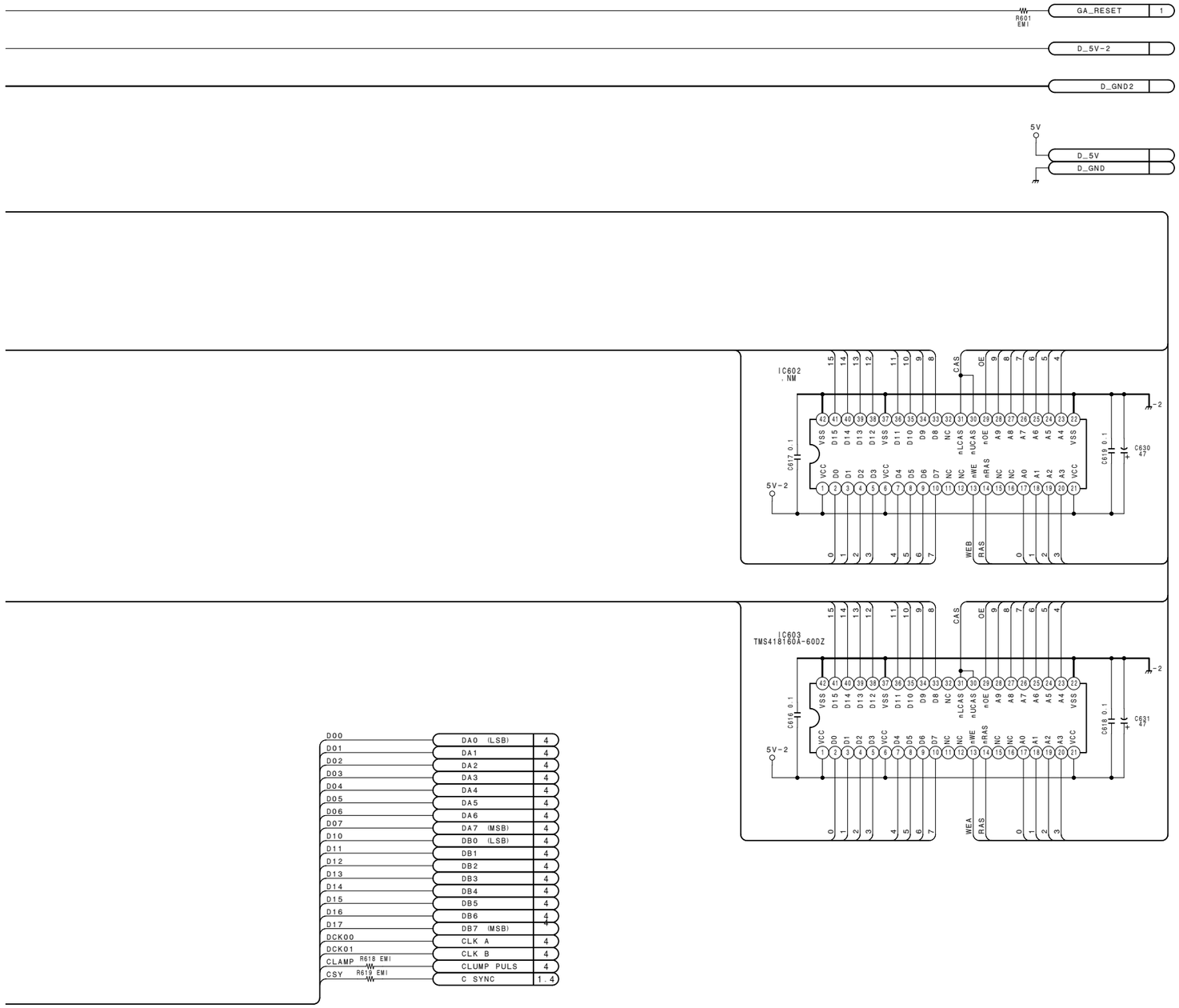


MA-91 (2/5)

B-UP960-MA91-SM

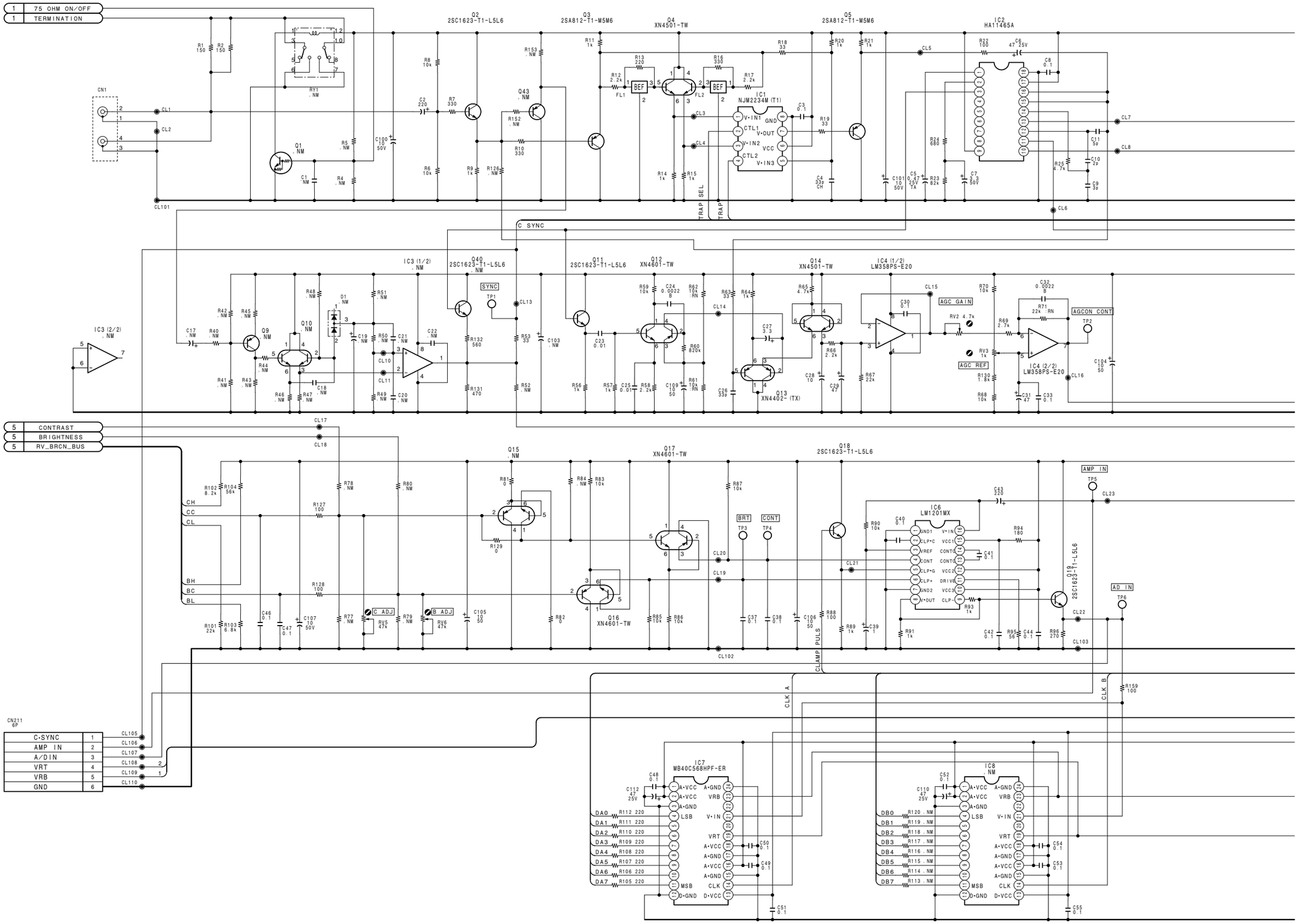

CN202 20P
HEAD_DATA10 1
HEAD_DATA9 2
HEAD_DATA8 3
HEAD_DATA7 4
HEAD_DATA6 5
HEAD_DATA5 6
HEAD_DATA4 7
HEAD_DATA3 8
HEAD_DATA2 9
HEAD_DATA1 10
HEAD_CLK 11
nHEAD_STB 12
nHEAD_LATCH 13
HEAD_BEO 14
HEAD_THERM2 15
HEAD_THERM1 16
GND 17
VDD 18
GND 19
VDD 20
THERMISTOR1
THERMISTOR2
BEO
_BLK
G/A_BUS
_PRT
VF
EXTV
IC601
CXD8726R
IC604
CXD8932Q
IC605
IC606
DS1000Z-100 (TE2)
5V
5V-2

MA-91 (3/5)

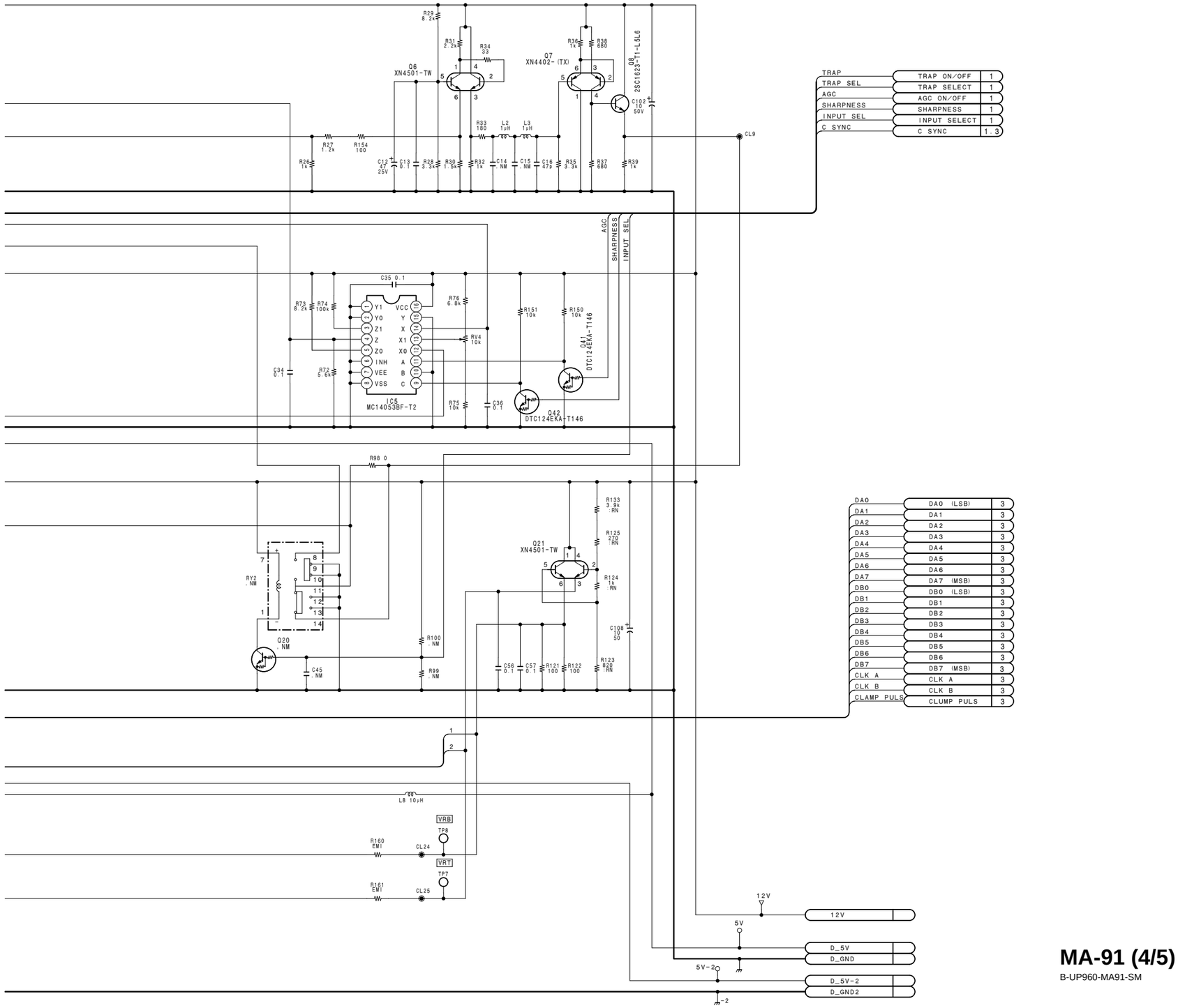


MA-91 (3/5)

B-UP960-MA91-SM

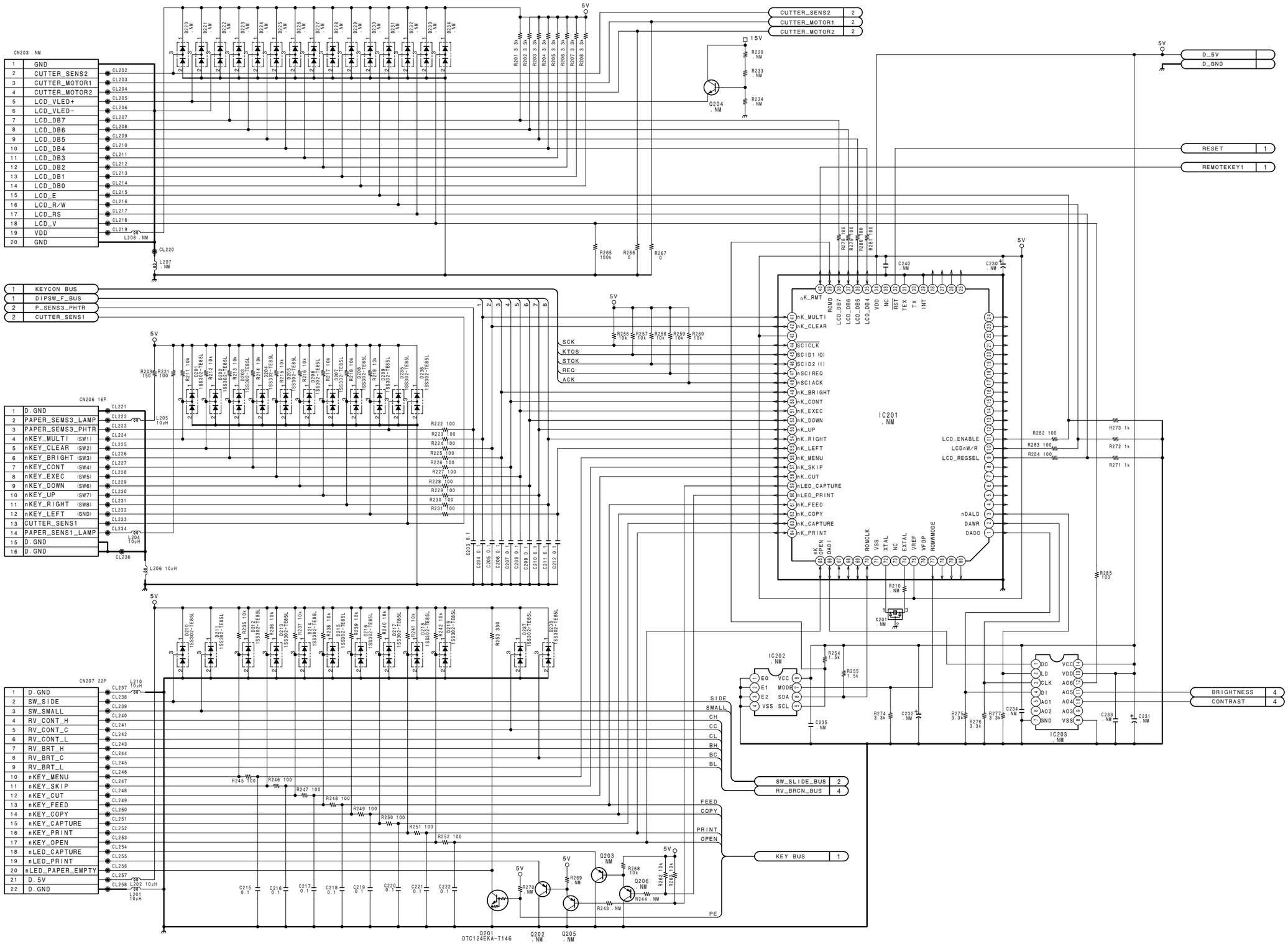

1 75 OHM ON/OFF
1 TERMINATION
CN1
CL1
CL2
CL101
RV1 . NM
Q1 . NM
Q2 2SC1623-T1-L5L6
Q3 2SA812-T1-M5M6
Q4 XN4501-TW
Q5 2SA812-T1-M5M6
IC1 NJM2234M (T1)
V+IN1
GND
CTL1
V+OUT
V+IN2
VCC
CTL2
V+IN3
IC2 HA11465A
FL1
FL2
BEF
TRAP SEL
TRAP
C SYNC
CL3
CL4
CL5
CL6
CL7
CL8
IC3 (1/2) . NM
IC3 (2/2) . NM
Q40 2SC1623-T1-L5L6 . NM
Q9 . NM
Q10 . NM
Q11 2SC1623-T1-L5L6
Q12 XN4601-TW
Q13 XN4402- (TX)
Q14 XN4501-TW
IC4 (1/2) LM358PS-E20
IC4 (2/2) LM358PS-E20
SYNC
TP1
CL13
CL14
CL15
CL16
AGC GAIN
AGC REF
AGCON CONT
RV2 4.7k
RV3 1k
TP2
5 CONTRAST
5 BRIGHTNESS
5 RV_BRCN_BUS
CL17
CL18
Q15 . NM
Q16 XN4601-TW
Q17 XN4601-TW
Q18 2SC1623-T1-L5L6
Q19 2SC1623-T1-L5L6
BRT
CONT
TP3
TP4
CL19
CL20
CL21
CL22
CL23
CL102
CL103
AMP IN
TP5
AD IN
TP6
IC6 LM1201MX
GND1
V+IN
CLP+C
VCC1
V/REF
CONT1
CONT
CONT2
CLP+G
VCC2
CLP+
DRIVE
GND2
VCC3
V+OUT
CLP-
CH
CC
CL
BH
BC
BL
C ADJ
B ADJ
RV5 47k
RV6 47k
CLAMP PULS
CLK A
CLK B
CN211 6P
C-SYNC 1
AMP IN 2
A/DIN 3
VRT 4
VRB 5
GND 6
CL105
CL106
CL107
CL108
CL109
CL110
IC7 MB40C568HPF-ER
IC8 . NM
A-VCC
A-GND
VRB
LSB
V-IN
VRT
MSB
CLK
D-GND
D-VCC
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7

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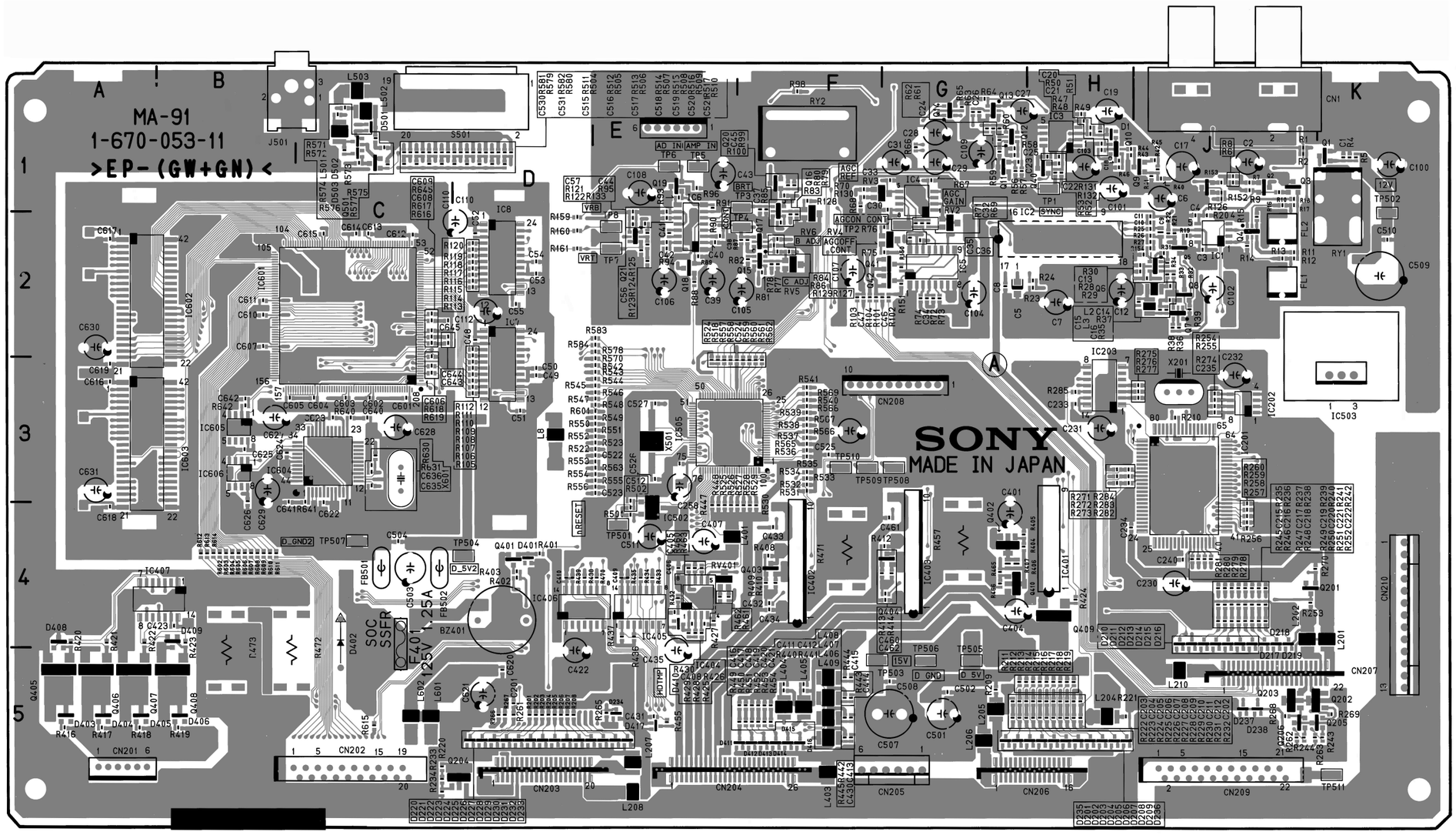
MA-91 (4/5)

B-UP960-MA91-SM



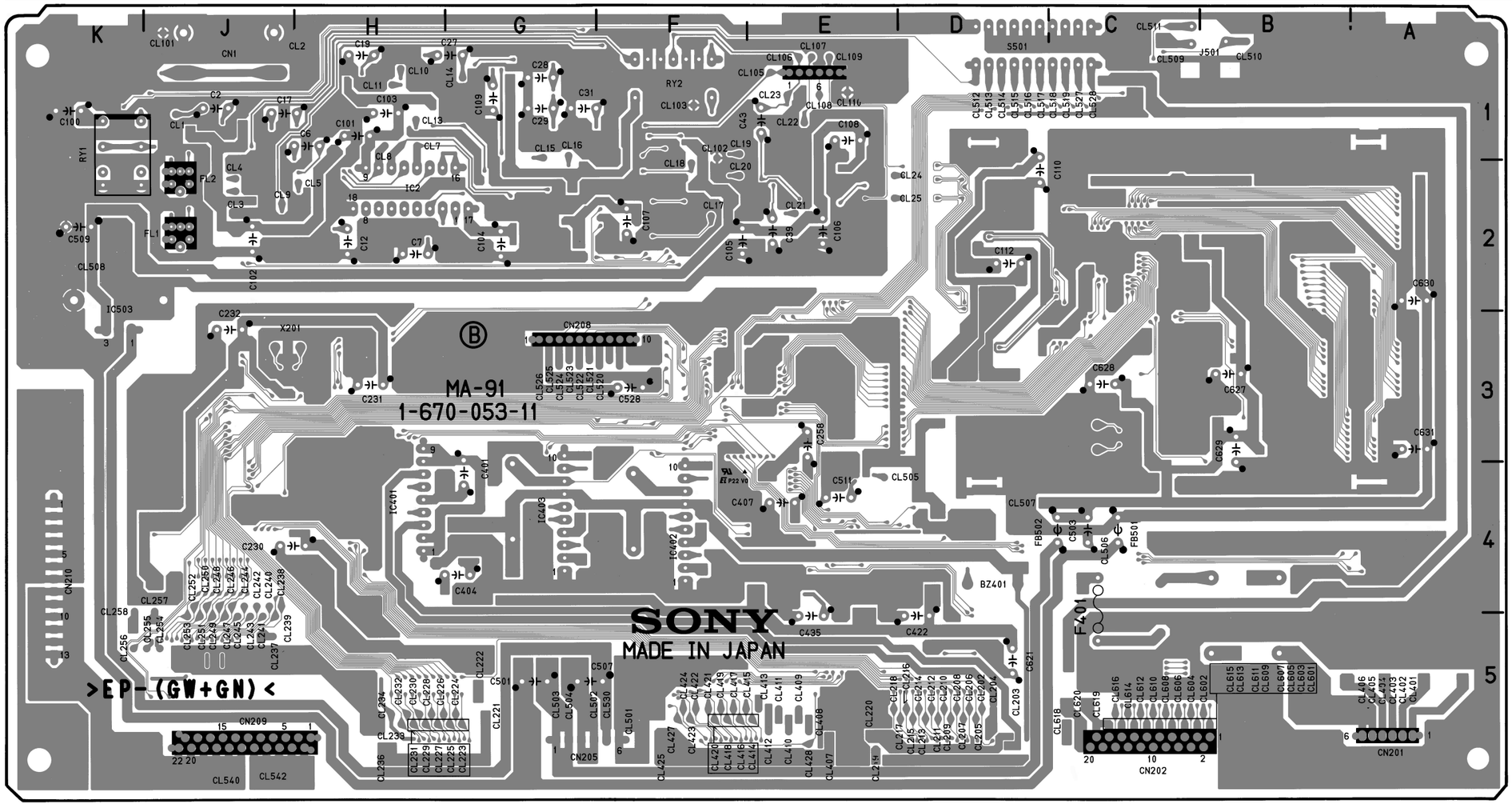
MA-91 (5/5)

B-UP960-MA91-SM



MA-91 - A SIDE -
1-670-053-11

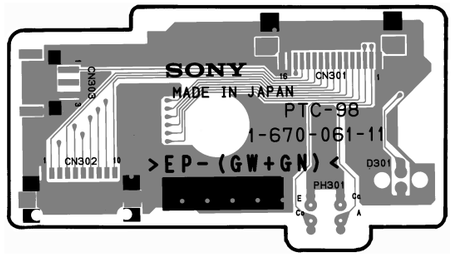
BZ401	D-4	IC402	F-4
		IC403	G-4
CN1	J-1	IC404	E-4
CN201	A-5	IC405	E-4
CN202	C-5	IC406	D-4
CN203	D-5	IC407	B-4
CN204	E-5	IC502	E-4
CN205	G-5	IC503	K-3
CN206	H-5	IC505	E-3
CN207	J-5	IC601	C-2
CN208	G-3	IC602	A-2
CN209	J-5	IC603	A-3
CN210	K-4	IC604	C-3
CN211	E-1	IC605	B-3
		IC606	B-3
D1	H-1		
D201	H-5	J501	B-1
D202	H-5		
D203	H-5	Q1	K-1
D204	H-5	Q2	J-1
D205	H-5	Q3	J-1
D206	H-5	Q4	J-2
D207	H-5	Q5	J-2
D208	H-5	Q6	J-2
D209	H-5	Q7	J-2
D210	J-4	Q8	J-2
D211	J-4	Q9	J-1
D212	J-4	Q10	H-1
D213	J-4	Q11	G-1
D214	J-4	Q12	G-1
D215	J-4	Q13	G-1
D216	J-4	Q14	G-1
D217	J-4	Q15	F-2
D218	J-4	Q16	F-1
D219	J-4	Q17	F-2
D220	D-5	Q18	E-2
D221	D-5	Q19	E-1
D222	D-5	Q20	F-1
D223	D-5	Q21	E-2
D224	D-5	Q41	G-2
D225	D-5	Q42	G-2
D226	D-5	Q43	J-1
D227	D-5	Q201	J-4
D228	D-5	Q202	K-5
D229	D-5	Q203	J-5
D230	D-5	Q204	D-5
D231	D-5	Q205	K-5
D232	D-5	Q206	J-5
D233	D-5	Q401	D-4
D234	E-5	Q402	G-4
D235	H-5	Q403	F-4
D236	H-5	Q404	F-4
D237	J-5	Q405	A-5
D238	J-5	Q406	A-5
D401	D-4	Q407	A-5
D402	C-4	Q408	B-5
D403	A-5	Q409	H-4
D404	A-5	Q410	G-4
D405	A-5	Q501	C-1
D406	B-5		
D408	A-4	RV2	G-2
D409	B-4	RV3	F-1
D410	E-4	RV4	G-2
D411	F-5	RV5	F-2
D412	F-5	RV6	F-2
D413	F-5	RV401	E-4
D414	F-5		
D415	F-5	RY1	K-1
D416	F-5	RY2	F-1
D417	E-5		
D501	C-1	TP1	H-1
D502	C-1	TP2	G-2
D503	C-1	TP3	F-1
		TP4	F-2
F401	C-4	TP5	E-1
		TP6	E-1
FB501	C-4	TP7	E-2
FB502	C-4	TP8	E-2
		TP501	E-4
FL1	J-2	TP502	K-1
FL2	J-2	TP503	F-5
		TP504	D-4
IC1	J-2	TP505	G-5
IC2	H-2	TP506	G-5
IC3	H-1	TP507	C-4
IC4	G-1	TP508	G-3
IC5	G-2	TP509	F-3
IC6	E-2	TP510	F-3
IC7	D-3	TP511	K-5
IC8	D-2		
IC201	J-3	X201	J-3
IC202	J-3	X501	E-3
IC203	H-3	X601	C-3
IC401	H-4		



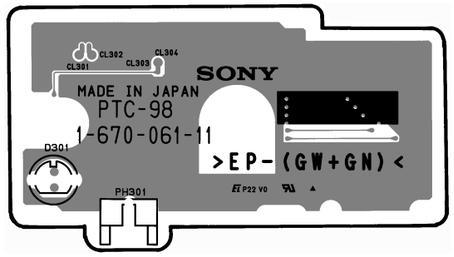
MA-91 - B SIDE -

1-670-053-11

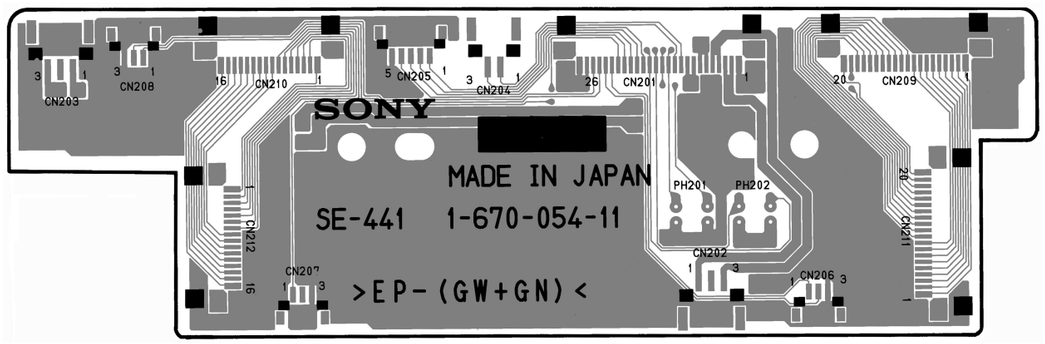
BZ401	D-4	IC402	F-4
		IC403	G-4
CN1	J-1	IC404	E-4
CN201	A-5	IC405	E-4
CN202	C-5	IC406	D-4
CN203	D-5	IC407	B-4
CN204	E-5	IC502	E-4
CN205	G-5	IC503	K-3
CN206	H-5	IC505	E-3
CN207	J-5	IC601	C-2
CN208	G-3	IC602	A-2
CN209	J-5	IC603	A-3
CN210	K-4	IC604	C-3
CN211	E-1	IC605	B-3
		IC606	B-3
D1	H-1		
D201	H-5	J501	B-1
D202	H-5		
D203	H-5	Q1	K-1
D204	H-5	Q2	J-1
D205	H-5	Q3	J-1
D206	H-5	Q4	J-2
D207	H-5	Q5	J-2
D208	H-5	Q6	J-2
D209	H-5	Q7	J-2
D210	J-4	Q8	J-2
D211	J-4	Q9	J-1
D212	J-4	Q10	H-1
D213	J-4	Q11	G-1
D214	J-4	Q12	G-1
D215	J-4	Q13	G-1
D216	J-4	Q14	G-1
D217	J-4	Q15	F-2
D218	J-4	Q16	F-1
D219	J-4	Q17	F-2
D220	D-5	Q18	E-2
D221	D-5	Q19	E-1
D222	D-5	Q20	F-1
D223	D-5	Q21	E-2
D224	D-5	Q41	G-2
D225	D-5	Q42	G-2
D226	D-5	Q43	J-1
D227	D-5	Q201	J-4
D228	D-5	Q202	K-5
D229	D-5	Q203	J-5
D230	D-5	Q204	D-5
D231	D-5	Q205	K-5
D232	D-5	Q206	J-5
D233	D-5	Q401	D-4
D234	E-5	Q402	G-4
D235	H-5	Q403	F-4
D236	H-5	Q404	F-4
D237	J-5	Q405	A-5
D238	J-5	Q406	A-5
D401	D-4	Q407	A-5
D402	C-4	Q408	B-5
D403	A-5	Q409	H-4
D404	A-5	Q410	G-4
D405	A-5	Q501	C-1
D406	B-5		
D408	A-4	RV2	G-2
D409	B-4	RV3	F-1
D410	E-4	RV4	G-2
D411	F-5	RV5	F-2
D412	F-5	RV6	F-2
D413	F-5	RV401	E-4
D414	F-5		
D415	F-5	RY1	K-1
D416	F-5	RY2	F-1
D417	E-5		
D501	C-1	TP1	H-1
D502	C-1	TP2	G-2
D503	C-1	TP3	F-1
		TP4	F-2
F401	C-4	TP5	E-1
		TP6	E-1
FB501	C-4	TP7	E-2
FB502	C-4	TP8	E-2
		TP501	E-4
FL1	J-2	TP502	K-1
FL2	J-2	TP503	F-5
		TP504	D-4
IC1	J-2	TP505	G-5
IC2	H-2	TP506	G-5
IC3	H-1	TP507	C-4
IC4	G-1	TP508	G-3
IC5	G-2	TP509	F-3
IC6	E-2	TP510	F-3
IC7	D-3	TP511	K-5
IC8	D-2		
IC201	J-3	X201	J-3
IC202	J-3	X501	E-3
IC203	H-3	X601	C-3
IC401	H-4		



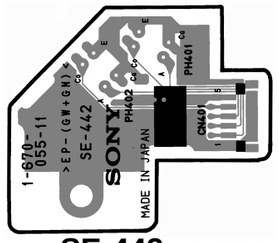
PTC-98 - A SIDE -
1-670-061-11



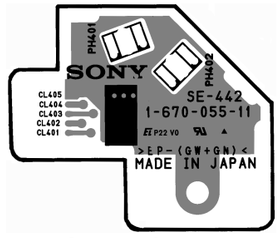
PTC-98 - B SIDE -
1-670-061-11



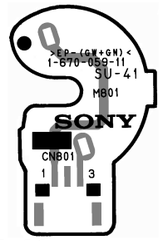
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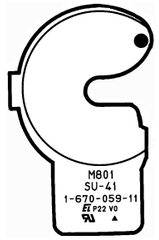
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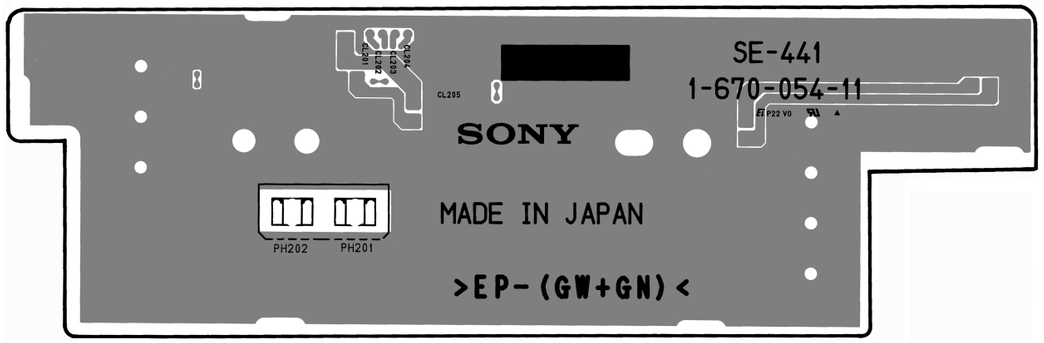
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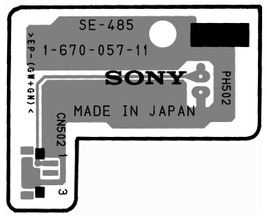
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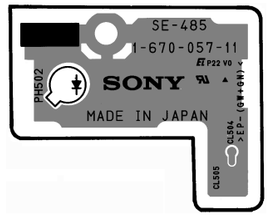
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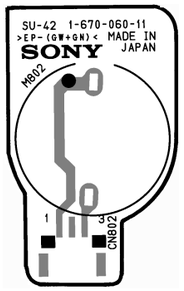
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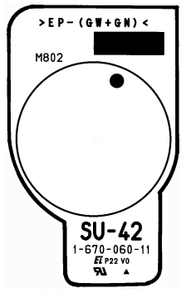
SE-485 - A SIDE -
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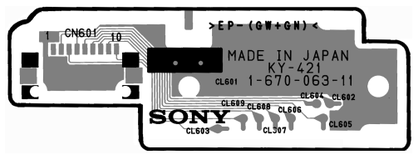
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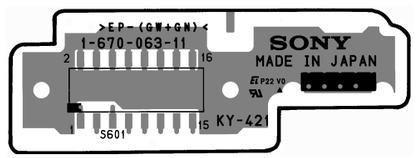
SU-42 - A SIDE -
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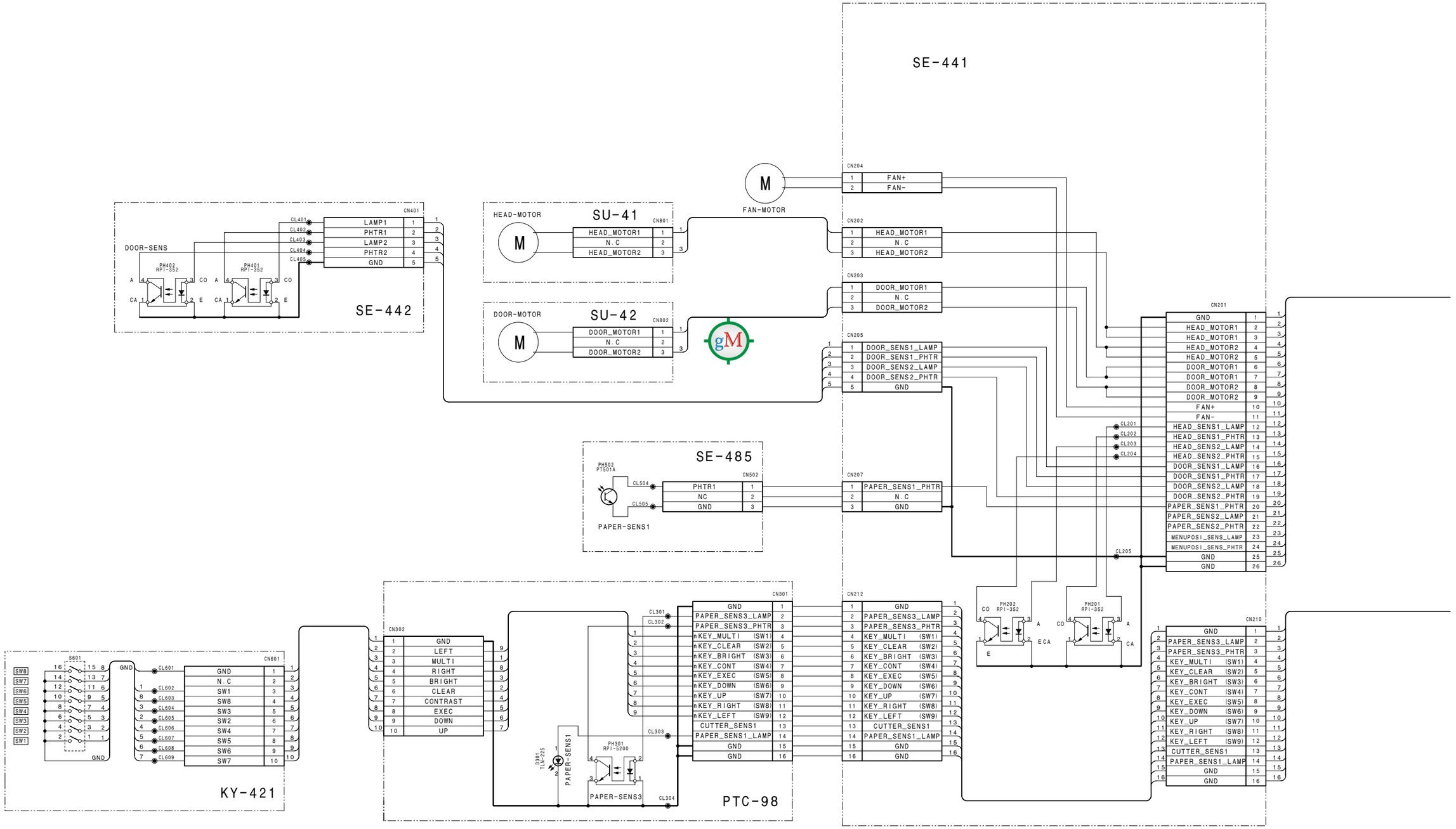
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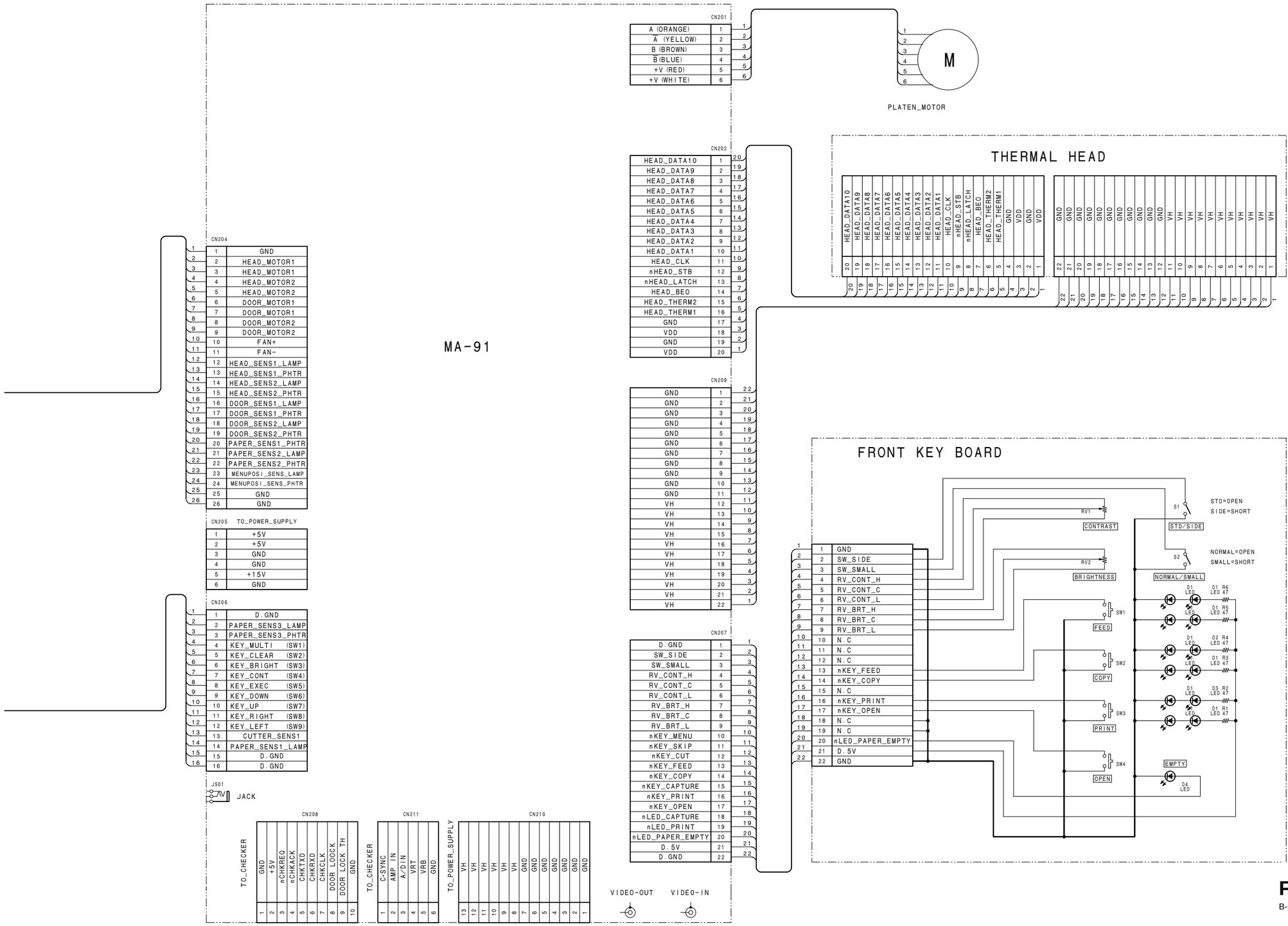


KY-421 - A SIDE -
1-670-063-11



KY-421 - B SIDE -
1-670-063-11


SE-441
SE-442
DOOR-SENS
PH402 RPI-352
PH401 RPI-352
CN401
LAMP1
PHTR1
LAMP2
PHTR2
GND
SU-41
HEAD-MOTOR
CN801
HEAD_MOTOR1
N.C
HEAD_MOTOR2
SU-42
DOOR-MOTOR
CN802
DOOR_MOTOR1
N.C
DOOR_MOTOR2
FAN-MOTOR
CN204
FAN+
FAN-
CN202
CN203
CN205
DOOR_SENS1_LAMP
DOOR_SENS1_PHTR
DOOR_SENS2_LAMP
DOOR_SENS2_PHTR
CN201
HEAD_SENS1_LAMP
HEAD_SENS1_PHTR
HEAD_SENS2_LAMP
HEAD_SENS2_PHTR
DOOR_SENS1_LAMP
DOOR_SENS1_PHTR
DOOR_SENS2_LAMP
DOOR_SENS2_PHTR
PAPER_SENS1_PHTR
PAPER_SENS2_LAMP
PAPER_SENS2_PHTR
MENUPOSI_SENS_LAMP
MENUPOSI_SENS_PHTR
SE-485
PH502 PT501A
CN502
PHTR1
NC
GND
PAPER-SENS1
CN207
PAPER_SENS1_PHTR
N.C
GND
PH202 RPI-352
PH201 RPI-352
CN212
CN210
KY-421
S601
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
CN601
SW1
SW8
SW3
SW2
SW4
SW5
SW6
SW7
PTC-98
CN302
LEFT
MULTI
RIGHT
BRIGHT
CLEAR
CONTRAST
EXEC
DOWN
UP
CN301
KEY_MULTI (SW1)
KEY_CLEAR (SW2)
KEY_BRIGHT (SW3)
KEY_CONT (SW4)
KEY_EXEC (SW5)
KEY_DOWN (SW6)
KEY_UP (SW7)
KEY_RIGHT (SW8)
KEY_LEFT (SW9)
CUTTER_SENS1
PAPER_SENS3_LAMP
PAPER_SENS3_PHTR
D301 TLN-225
PH301 RPI-5200
PAPER-SENS3



FRAME

B-UP960-HARNESS-SM

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